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3. Computer you own and size of disk required (check one):
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☐ IBM/Tandy & Compatibles with 3 1/2" disk drive
☐ Apple II Family & Compatibles with 5 1/4" disk drive

4. Child's name _____
 Child's birthdate: Month _____ Day _____ Year _____

5. Please check below if you have a:
☐ Printer ☐ Modem ☐ Color Monitor

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 We reserve the right to request additional information or reject any application or cancel any membership. Limited to new members in the continental USA only excluding AK. Sales tax will be added in PA and CA. We'll send you details of the club's operation with your enrollment shipment, and you have a 15-day no-obligation privilege to decide if you wish to continue as a member.



64/128 VIEW

T O M N E T S E L

If you read this column with any regularity, you'll recall that a couple of months ago I said Gazette would no longer be available on U.S. newsstands. It would be available in this country by subscription only.

I had visions of seedy characters loitering outside U.S. computer stores. They would approach customers, flash a Canadian *COMPUTE*, and ask, "Psst! Wanna buy a hot newsstand Gazette?"

Along the Rio Grande, at crossings formerly used by people trying to enter the U.S. without benefit of passport or visa, customs and immigration officials would encounter furtive figures struggling under heavy loads of plastic-wrapped magazines. Gazette-sniffing dogs would alert their handlers, and another illegal shipment of bootlegged *COMPUTE*s would be confiscated at the border.

Even if these unpleasant sights were only figments of my imagination, the letters we received were real. "Have you stopped publishing?" readers asked. "Where's my Gazette?"

In case you missed my April editorial, which explained about Gazette's being pulled from U.S. newsstands, don't dig through your back issues trying to find it. That's all changed anyway. Gazette is back!

Effective with the July issue, the full Gazette and Amiga sections are scheduled to appear once again in thousands of newsstand copies of *COMPUTE*. By the time you read this, the change should already be in effect—but not at all locations.

Look for Gazette in *COMPUTE* on sale at Software Boutiques, Software Etc., and Babbage's. These computer stores should have the Gazette newsstand editions first. We'll announce additional locations as they become available.

As most 64 and 128 enthusiasts know, they aren't alone in the world. Millions of 8-bit Commodores are in use from Belgium to Brazil and from Puerto Rico to Pakistan. From the publications and user group newsletters we receive from around the

world, we realize that there's a great deal of 64/128 activity going on that the average user never learns about. There are computer shows in England, new software releases in Australia, programming techniques developed in Germany, and more.

In our effort to bring you the best from the 8-bit Commodore world, we want to increase our international coverage. What's happening in your country that might interest 64 owners elsewhere? What's hot in software?

Each month I'd like to print "Column from Abroad," featuring the 64/128 activities in different countries. If you're a writer with your finger on the Commodore pulse in your country, I'd like to hear from you. Perhaps you know of a writer or columnist in your local newspaper or computer magazine who could prepare a 1000-word column. If you can recommend someone, have him or her get in touch with me at our Greensboro, North Carolina, office.

This month, we feature a partial listing of Commodore user groups in America. Next month we'll complete the listing and include the names and addresses of overseas groups that have returned our survey. As you'll see, there are quite a few of them.

Programmers from around the globe supply many of the type-in programs we feature in Gazette. In this issue, *Simulvideo*, an outstanding graphics-conversion utility, was submitted by Richard Penn, who lives in Montreal, Quebec.

Gazette Disk subscribers will enjoy *Sector Patrol*, a fast-paced arcade game that's this month's bonus program. Grant Young is the author and lives in Christchurch, New Zealand.

To give more recognition to all of our programmers, both international and domestic, next month we'll start publishing biographical information about them at the end of each program's documentation. So if you submit a program to Gazette, include information about your occupation, hobbies, or any personal information you'd like to share with our readers. □

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NEWS & NOTES

Tee Off

Play the most infamous courses of the U.S. Open with a new add-on disk from Jack Nicklaus and Accolade (550 South Winchester Boulevard, San Jose, California 95128). *Jack Nicklaus Presents the Great Courses of the U.S. Open* (\$14.95) is the fourth in a series of course disks for use with Nicklaus's *Unlimited Golf & Course Design* and *Greatest 18 Holes of Major Championship Golf*.

The new disk contains three of the most challenging and popular courses to play host to the U.S. Open: Pebble Beach Golf Links, Oakmont Country Club, and Baltusrol Golf Club. These three courses (in California, Pennsylvania, and New Jersey, respectively) have been the sites for 11 U.S. Open championships, and Nicklaus has won at least one championship on each of them.

From the Grapevine

Need a new SID chip, upgraded ROM for your 1571, or Z80A CPU for your 128? If you're looking for spare parts, integrated circuits, chips, cables, or other items for your Commodore products—including your Amiga—look for them in the new free catalog from the Grapevine Group (3 Chestnut Street, Suffern, New York 10901; 800-292-7445).

Grapevine stocks service manuals, replacement printer heads, power supplies, diagnostic and alignment tools, and tutorials. Its catalog is a great resource for end users and repair centers.

Go Mobile

If you occasionally like to lean back in your chair with your keyboard in your lap but you hate to hassle with the 64's power cord, disk drive, and monitor cables, there's finally a cure. With a Detached Keyboard (\$60, plus \$3 shipping and handling) from SER (P.O. Box 5382, Racine, Wisconsin 53408-5382), you're no longer tied to one spot with your 64.

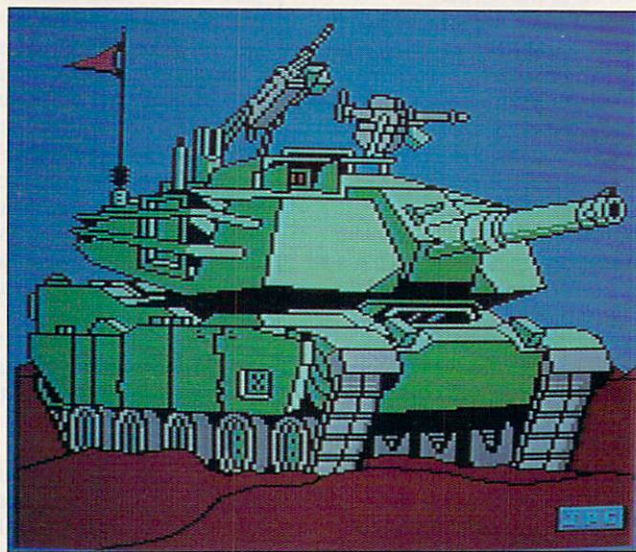
A six-foot cable frees your hands from the desktop, and an ergonomic palm rest saves your hands and wrists from long hours spent at the computer. Its single cable also eliminates the current nest of cables by letting you separate the 64 CPU from this accessible keyboard.

Seek and Destroy

Put on your camouflage fatigues and test your mapping skills with *Metal Gear* (\$14.95), a new release from Ultra Software (900 Deerfield Parkway, Buffalo Grove, Illinois 60089), a subsidiary of Konami.

Wind through five levels as you search for 20 special weapons and equipment to seek and destroy the title character and end the terror spree of the evil CaTaffy. Discover the weapons and equipment in enemy trucks and storehouses, or get them from certain soldiers of fortune.

Your most vital tool is your transceiver, which lets you communicate with Commander South, who is at Fox Hound's headquarters and feeds you crucial information on *Metal Gear*'s location. The mission ends when you destroy *Metal Gear*—or he destroys you. It's as simple as that.



Abrams M-1

Abrams M-1, by John Green of Freeport, New York, is this disk's Picture of the Month.

Each month *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay \$50 for each piece of art we accept for "Gazette Gallery" and an extra \$50 for the one selected as Picture of the Month. Send original art to Gazette Gallery, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

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NEWS & NOTES

Great GEOS Graphics

GEOS users now have 16 disks of ready-to-use graphics with the release of *Diskart 13*, *14*, and *15* (\$10.50 each) from Those Designers (3330 Lewis Avenue, Signal Hill, California 90807).

Diskart 13 contains international symbols, hobbies and pastimes, toys, national flags, and mechanical devices. *Diskart 14* has commercial and military aircraft, military vehicles, and sports. Look for plants and flowers, trees and shrubs, furniture silhouettes, and churches on *Diskart 15*.

New at the Zoo

The Electronic Zoo (3431-A Benson Avenue, Baltimore, Maryland 21227) has announced two new games for the 64: *Black Gold* (\$24.95) and *Spherical* (\$24.95).

Join the international power brokers in *Black Gold* and guide your company in a global search for oil. Buy and sell oil fields, build pipelines, study surveys, drill for oil, and sabotage the competition in this multiplayer game.

Move two blocks, point your wand, and add a new wall in *Spherical*. Back up and create some steps to the next platform before the ball starts rolling. There are more than 200 levels in this arcade-style game.

GEOS Fonts

As an introductory offer for its new 80-page *Geo Font Reference Booklet*, Parsec (P.O. Box 111, Salem, Massachusetts 01970) is bundling its font booklet with 12 double-sided disks filled with more than 550 public domain GEOS fonts (\$24.95 plus \$2.90 shipping and handling for the U.S., \$7.50 for Canada).

The booklet contains examples of each font. This makes it very easy for GEOS users to identify the fonts they want to use in a document, see how they look, and then locate them on disk. It's a great reference tool.

Unlimited Life

Want to play your favorite game with unlimited lives? Then try *Strata Gems* (\$5 each, plus \$3.50 shipping and handling) from Silvasoft (P.O. Box 231, Charlotte, Vermont 05445).

Each disk contains parameters for 50 games, including both new and old titles. These parameters are trainers you add to the game to give yourself unlimited lives or a limitless supply of ammunition or energy. Some games have three or more trainers you can add.

Titles on *Strata Gems I* include *Baal*, *Castlevania*, *Frogger*, *Krazy Kong*, *Tongue of the Fatman*, and many more. On *Strata Gems II*, look for *Batman*, *Demon Stalkers*, *Rocky Horror*, *Starfire*, *Test Drive*, and 45 others.

Intergalactic Warfare

Created by the codesigner of the Archon series, *Star Control* (\$39.95) from Accolade (550 South Winchester Avenue, San Jose, California 95128) combines deep strategy with action-arcade tactical combat.

As a veteran commander of an Alliance fleet of battle cruisers, you've been battling the evil Hierarchy for years. Now the aliens are invading interstellar neighbors and enslaving the inhabitants. To save the galaxy from this invading horde, you must construct and deploy your fleet, explore new stars, and build mines, colonies, and fortifications. Target the enemy's home star system, but don't leave yours undefended. Choose from nine scenarios, or build your own in this one- or two-player science-fiction war game. In the one-player game the computer opponent can be assigned one of three levels of skill: standard, good, or awesome. This level will affect the outcome of its tactical and strategic abilities. Choose from 14 ships and let the melee begin.

Windfall from Commodore

What happens when a computer manufacturer drops many of its dealers like so many bad apples? Another manufacturer recognizes their worth, picks them up, and helps them to shine.

That's the idea behind Windfall, a new educational marketing program announced by Commodore Business Machines (1200 Wilson Avenue, West Chester, Pennsylvania 19380). It's targeted at Apple educational dealers, ex-Apple educational dealers, and value-added retailers.

Under Commodore's new program, dealers can become authorized as quickly as one week after being interviewed. They then become eligible to buy demonstration equipment at discounted prices, including the new UNIX workstations.

"We now feel that we are able to appeal to a lot of good dealers who have significant experience in educational sales," said Paul Calkin, director of education and UNIX marketing at Commodore. "This program offers them a way to use their current contacts and expertise in the educational area to generate significant, profitable revenue with what we feel is the most capable and affordable desktop machine in the world."

Users of Commodore equipment should also benefit from Windfall and its new prices. "Commodore's new educational pricing structure makes it easy for educational institutions, teachers, and higher education students to buy at significant discounts off of the list price," said Ron Stanczak, Commodore vice president of sales. "Our new dealer education program has been well thought out, and we believe it to be one of the best in the industry."

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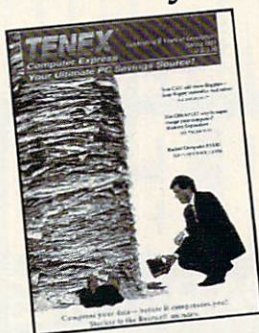
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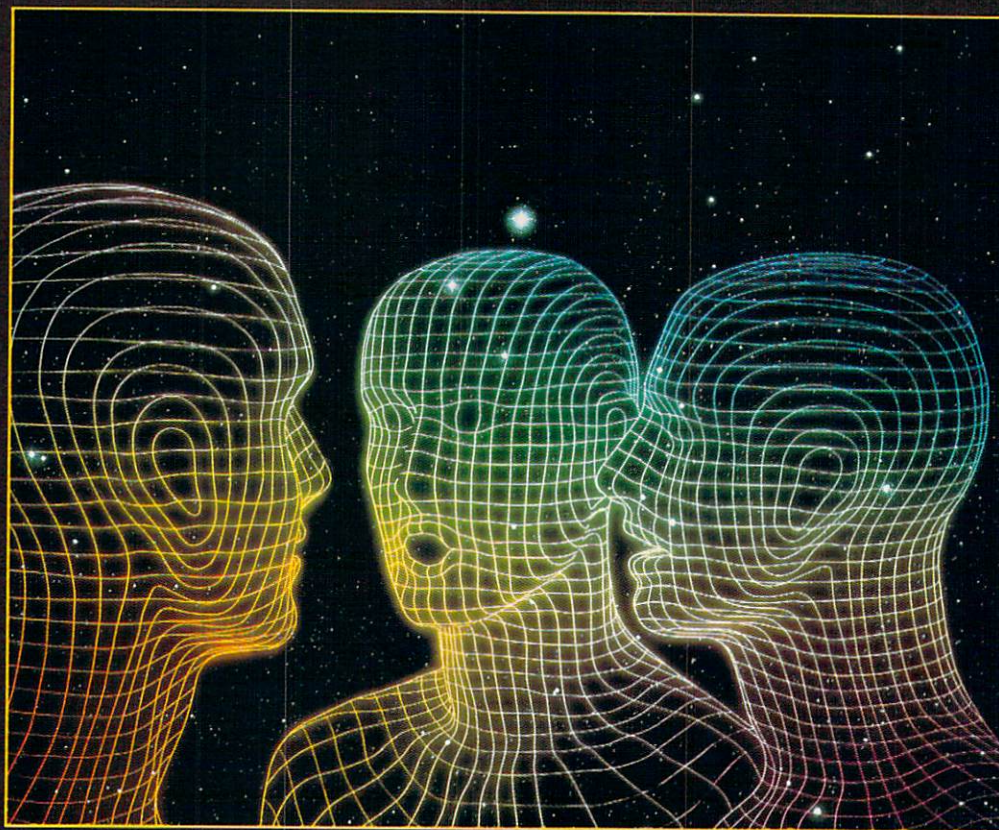
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A GUIDE TO
COMMODORE
USER GROUPS
PART ONE

EDITED BY KANDI SYKES

UNIPHOTO/PICTOR

This annual Gazette feature provides an up-to-date list of user groups across the U.S.A., throughout Canada, and around the world. Part 1 includes states Alabama-New Hampshire. Under each state heading, the groups are listed in order according to ZIP code.

User groups from the remaining states, APO sources, and foreign countries will be listed next month.

ALABAMA

- Birmingham Commodore Club**, P.O. Box 59564, Birmingham, AL 35259
Valley Commodore Users Group (VCUG), P.O. Box 835, Decatur, AL 35602-0835
Scottsboro Commodore Users Group, Rte. 5, Box 255, Scottsboro, AL 35768
Montgomery Area Commodore Komputer Society (MACKS), 606 Larkin Ln., Montgomery, AL 36109
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ALASKA

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This bizarre fighting game takes place in the domain of Mondu the Fat. He watches over combatants in his arena. They must fight to the death, and he delights in the contest. In *Mondu's Fight Palace*, you have been thrown into a pit to battle the Fatman's contenders. There are two ways to escape: defeat all of Mondu's cronies and the Fatman himself or die. I don't think it's hard to choose.

Although fight games are a dime a dozen, *Fight Palace* goes beyond the norm and breaks the mold. In addition to dazzling your opponents with your acrobatic moves, power-packed punches, and high kicks, you can choose weapons and bet on your fight. These additional options make *Mondu's Fight Palace* more challenging and entertaining. Not only are you playing against a computer-based opponent or second player, but you are also playing against the bet you made on yourself.

You start the game with 1000 credits. Use part of this money to buy weapons from Doctor Kadaver's Weapons Store and part to bet on how long it will take you to finish off the other creature. Only the first opponent is a humanoid. All of the rest are members of intergalactic races, and they each have unusual fighting traits and styles.

To help even the odds, you can buy weapons to use in the arena. You can only buy those that cost less than your current number of credits, and

Dr. Kadaver doesn't give credit.

Fight Palace is played from a side view and with a number of different backgrounds. Below the main screen are pictures of the opponents, weapons boxes, and bars representing success, life, and attack power. Hitting one of the function keys activates a weapon. All other movements and actions are performed with the joystick.



It takes three or four games to get used to *Fight Palace*, after which you can actually try to defeat the creatures. After another few games, you should know some of the opponents well enough to beat them in a short amount of time. Before long, you'll be racking up the credits and gearing up to beat the Fatman.

The graphics in *Fight Palace* are detailed and colorful. Particularly noticeable are the strange movements and unique appearances of each of the ten creatures in the game, from Colono and Behemoth to Rubic and Freezer. The different creatures give the game its personality. Sounds are minimal and unnecessary in this game. You won't miss them because you'll be too busy trying to survive.

RUSS CECCOLA

Commodore 64 or 128—\$29.95

ACTIVISION
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Circle Reader Service Number 310

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There are two playing options in this game. You can simply drive the Ferrari around the racetrack without worrying about things like schedules or season standings. This option is the easier one to learn, since it requires that you read only a short set of instructions. As the game starts, there's a short demo to help you get acquainted quickly with the game. The minute you feel comfortable, just move your joystick, and off you go!

For those of you who want a real challenge, there's the second option. This is just like real Grand Prix racing. You design, modify, and test your own Ferrari. There are deadlines and schedules to keep. You tell the pit crew what to do to your Ferrari. Even though there are numerous rules concerning designing and setting specifications for your car, don't worry about accidentally modifying a parameter that would violate Grand Prix racing's rules. The software won't let you.

I found the manual to be well written, and the steps are easy to follow for the second play option. If you do select this challenging second option, be prepared to learn the track in limited time. You must also find the best settings for your Ferrari's peak performance and the best way to conserve fuel for the actual race.

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REVIEWS

the program isn't a single race but a whole series. Each race is at a different track and consists of several practice sessions before the actual race.

The manual helps you design and set all the specifications on your Ferrari. I found the manual's panel diagrams to be extremely helpful in designing and setting the car's specifications for the big race. Fiorano is the main base for setting up and modifying your Ferrari. Here, you set the controls for the race, such as skill level and the race's length. From this point, you can go to the garage to set major system components, such as the engine or suspension, or to the wind tunnel to adjust the Ferrari's wings. You can also fine-tune suspension and wing adjustments at the pit.

If you know little about setting up a racing Ferrari, don't worry. The program has a character named Mauro to assist you in making these decisions. His suggestions will always appear in the panels. It's up to you whether to accept his suggestions or to come up with your own ideas after reading the manual's detailed descriptions on each setting.

After you've tested your Ferrari and made all the necessary modifications, it's time for the big race. With a



push of a joystick, you're off to your first race! Just use the joystick to steer, accelerate, and brake. The engine's roar makes you feel as though you're actually at a Grand Prix, sitting behind the wheel of a high-speed racer.

Overall, this software program is entertaining and challenging. Even though I have yet to become the series champion, I still have a lot of fun driving in *Ferrari Formula One*.

CHRIS STAWASZ

Commodore 64 or 128, joystick—\$29.95

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171

Circle Reader Service Number 311

BIG BLUE READER

A while back, there was a rumor circulating that someone was developing an interface that would allow the 1581 to be used with a PC—a feasible but rather expensive proposition when you consider that most built-in 3½-inch drives cost less than half the street price of the 1581.

The February 1988 issue of *COMPUTE!* featured a BASIC program that allowed the 1571 disk drive to read and write PC disks. This program worked well, but it did have some drawbacks. Among its most troubling foibles was the fact that it seemed to choke on large files.

I discovered this last fall as my wife was typing her grandfather's memoirs on my 64 and I was then typesetting them on my PC. Long chapters caused the program to crash or to become twitchy. Three chapters simply refused to be translated, no matter what I did.

I decided to turn to SOGWAP's *Big Blue Reader* to see what it could do. Having spoken to the software's developer on the phone and knowing he was a capable programmer, it came as no surprise that *Big Blue Reader*

solved the whole problem, providing rapid conversion between formats with no apparent problems.

More and more Commodore fans own both PCs and 64s or 128s. Using a program like *Big Blue Reader* turns this motley collection of operating systems and hardware into an efficient productivity machine.

The latest version of *Big Blue* can operate with the 1581 drive, translating files from 720K 3½-inch PC disks to 1581-compatible disks.

All this talk about translating files between formats can lead to some confusion, so let me explain that *Big Blue Reader* is not an emulator. The ability to convert a file from a PC disk to a Commodore disk doesn't mean that you'll be able to run *WordPerfect* on your Commodore. However, you can save a *WordPerfect* file on a PC disk as pure ASCII and transfer it to a Commodore disk for editing or printing with any Commodore word processor of your choice.

The ability to translate files from one disk format to another is the most important task of this software, but it's not the only useful feature. It will display the directory of a Commodore or a PC disk, format either type of disk, and display or print files in either format. It can convert files between Commodore ASCII and the ASCII that the rest of the world uses.

Although *Big Blue Reader 128* comes with a version for the 64, 128 users should use the 128 version because it supports CP/M and Commodore RAM expansion units and operates with one or two disk drives (one of which must be a 1571 or a 1581). Also, it works in 40- or 80-column mode. In 80-column mode, it operates at the full 2-MHz clock speed.

When *Big Blue Reader 128* copies, it loads files into memory and then copies them to the new disk. This feature eliminates all unnecessary disk swapping. Furthermore, it

uses burst mode to enhance the speed of the file-transfer process.

ROBERT BIXBY

Commodore 128, 1571 or 1581 disk drive—\$44.95
Commodore 64, 1571 or 1581 disk drive—\$29.95

SOGWAP SOFTWARE
115 Belmont Rd.
Decatur, IN 46733
(219) 724-3900
Circle Reader Service Number 312

REAL FAST 64 BASIC

The 64's resident BASIC is easy to learn and use, but it has its drawbacks. BASIC provides the programmer with few tools to develop compact, powerful code.

In addition, BASIC programs tend to run slowly because they're in-

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terpreted. That means before an instruction can be executed, it must first be figured out by additional low-level software. Compiling a program—converting it to machine code for speed—creates an awkward additional step. It means keeping track of at least one additional file and may increase the program size. Writing in machine code combats the sparseness of commands and slow runtimes, but it leads to even more difficulties during the debugging and revising processes.

For years attempts have been made to redress BASIC's speed deficiencies. One of the latest is *Real Fast 64 BASIC (RFB)* from Real R & D. It is interpreted, like the resident BASIC 2.0, but it precompiles GOSUBs and GOTOs for speed. It adds more than 90 new commands, allows labels to take the place of line numbers, provides the user with the option to create custom commands, doesn't interfere with BASIC 2.0, and is even compatible with *COMPUTE's Meta-BASIC* enhancement.

RFB includes a powerful syntax for machine language-like control of memory registers and control of bit settings within registers. For brevity, there are single-character commands. Error trapping is available to guard against results that might otherwise crash your program. *RFB* is also smart enough to be extensible, which means that the programmer can piece together preexisting commands and functions to build new commands.

On the downside, *RFB* is almost generic in design, with no provision made for 64 graphics (other than sprite commands) or sound. Also, some parts of the documentation make readers stop and review what they've just read. Lack of clarity isn't a major problem, however, and programming examples do much to make up for any gaps in immediate comprehension.

On balance, I was mightily impressed; I recommend *Real Fast 64 BASIC* as a sophisticated alternative language for serious 64 programmers.

BRUCE BOWDEN

Commodore 64 or 128—\$30.95

REAL R & D
12137-96 St.
Edmonton, AL
Canada T5G 1V9

Circle Reader Service Number 313

WAR OF THE LANCE

SSI's latest addition to the Advanced Dungeons & Dragons (AD & D) series is a war game set in the Dragonlance world. *War of the Lance* is the perfect combination of an original war game system and a detailed scenario to keep it fun to play and exciting.



The game system has many unique features such as diplomacy, side quests for champions, and magical items such as dragon orbs to aid your armies. The setting and background of the game far outweigh its technical aspects.

War of the Lance is set on the continent of Ansalon in the year 348, and evil dragons have returned. Players control the Whitestone forces, who are the good guys. The computer or another player controls the Highlord armies, which consist mostly of dragons and Draconians. The action starts just as the Highlord armies are invading Silvanesti.

Highlord starts with an advantage over Whitestone, since it consists of four nations to Whitestone's two. To make matters worse, Whitestone's dragons don't enter the game until it's more than half over. This makes the game more than a challenge, even for experienced war gamers.

The game's history goes back to an earlier time, however. It goes back a millennium, when dragons were banished from Ansalon. During that time, magical artifacts were created to defeat the dragons. After the dragons disappeared, the artifacts were lost and the magical secrets forgotten. When the game begins, the Whitestone and Highlord champions are

out to find these lost artifacts and learn how to use them. If an army can find a dragon orb, for example, it can use it to make dragons retreat from the battlefield.

The appearance of reinforcements during certain phases of the game is a feature that adds suspense. Units may be activated at random. For example, the Highlord armies receive more Draconian units at almost every turn. Anytime toward the end of the game, undead infantry and flying cities, called *citadels*, will appear. On the Whitestone side, good dragons and Solamnic knights are some of the units that might join its forces.

A more direct way of gaining units is through alliances. The Whitestones and Highlords have unique methods of diplomacy. The Whitestones send diplomats to the countries and use gentle persuasion; the Highlords declare war on a country if it isn't an ally. Such a declaration is usually sufficient to make a country join the Highlords.

Movement and combat phases are similar to those of other war games. The side that has the initiative moves all of its troops either by ground, aerial, or naval transport. Attack orders are given, and the combat begins. When one side's attacks are finished, the other side starts its turn. There are some interesting twists, though—dwarves are the only soldiers who can go through mountains, and elves fight better in forests.

Not only is *War of the Lance* a war game, but it's a role-playing game. It's also a lot of fun. The extensive background adds spice that's missing in many games. The graphics are decent, and there's some animation. The instruction book is also very clear and precise. The game is fairly complicated, though, and it can be slow-moving at times. But considering how much fun it is to play, once you've finally mastered *War of the Lance*, you'll realize it was worth the effort.

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FEEDBACK

QUESTIONS FROM OUR READERS

What's the Score?

I'm trying to write a machine language game. I have everything worked out except for the score, which could be as high as 900. How do I print this out to the screen? What I've done with single characters is to load the accumulator with the ASCII value and JSR to CHROUT. But how do you decode a number that's stored in low-byte/high-byte format?

DAVID HOLT
RICHMOND, VA

Commodore BASIC has provisions for printing two-byte numbers in ASCII (a major purpose is for line numbers).

From 64 machine code, simply store the low byte in the X register and the high byte in the A register (Accumulator); then JSR to \$BDCD (48589). On the 128, select a bank with BASIC ROM switched in, load the same registers, and JSR to \$8E32 (36402). The decimal equivalent will be printed at the cursor. On the 64, to get the address of the ASCII string without printing, start with .X and .A loaded as above and use this code:

```
STA $62 ;STORE THE HIGH BYTE
STX $63 ;STORE THE LOW BYTE
LDX #$90
SEC
JSR $BC49 ;CONVERT TO A
          FLOATING-POINT
          NUMBER IS FAC1
JSR $BDDF ;CONVERT TO AN ASCII
          STRING
```

On the 128, with BASIC switched in, use

```
STA $64 ;STORE THE HIGH BYTE
STX $65 ;STORE THE LOW BYTE
LDX #$90
SEC
JSR $8C75 ;CONVERT TO A
          FLOATING-POINT
          NUMBER IS FAC1
JSR $8E44 ;CONVERT TO AN ASCII
          STRING
```

In both cases, the low byte of the address of the ASCII string is returned in

.A; the high byte, in .Y. At the end of the string is a zero byte.

Which 128?

I've been thinking about buying a 128, but I notice that there were two models produced: the original 128 and the 128-D. What's the difference between the two?

Also, the sound on my 64 seems to have gone kaput. It was working fine before I moved it to another room. I've checked out the wires and the monitor, and everything seems fine. Do you think the sound chips have died?

JOHN J. REIMER
WILLIAMS LAKE, BC
CANADA

The 128-D differs from the original 128 in that it has an internally mounted disk drive. The 128-D also has a separate keyboard at the end of a very short cable and an upgraded 80-column display chip with more video memory. (It has twice the vertical resolution of the standard 128, which is not a big advantage for most users.) Neither of the 128 models is in production, but a few dealers still have 128-Ds in stock. (See recent ads in this magazine.) Used and reconditioned ones can be found, but with a built-in 1571 disk drive included, expect to pay more for a 128-D.

As for your second question, it's most likely that your SID (Sound Interface Device) chip has gone to that big socket in the sky. But since it happened during a move, it might have come loose from its socket if the computer got bumped. Get a technician to look at it or, if you want to check it yourself, open the case, remove the RF shield, and firmly seat the chip in its socket. It should be the chip marked 6581.

Write It In

It's hard to find *COMPUTE* with the Gazette section in it. Since my main interest is the Commodore 128, I am entering a subscription to Gazette. As the order form doesn't ask me to specify which section I want, I'm going to

write in that I want Gazette. I look forward to getting *COMPUTE*, as it's an excellent magazine.

But *COMPUTE* is more than just a magazine. It's a large part of any computer user's support network. As other support for the 64 and 128 wanes, I hope that *COMPUTE* will continue to be an important part of the Commodore information network. Your format is great, and I enjoy learning about other computer systems.

PAUL ARMSTRONG
CITRUS HEIGHTS, CA

*Thanks for the kind words, and we'll do our best to continue supplying readers with information about 8-bit Commodore computers and other systems as well. In case you didn't know, Gazette is now back in *COMPUTE* on many newsstands. To ensure that you get the Gazette edition that includes the type-in programs when you subscribe to *COMPUTE*, write Gazette across the subscription card.*

ROM Upgrades

I've noticed several ads for ROM upgrades for the 1571 and the 128. What do they do? Also, how do I go about submitting programs to your magazine?

GARY R. PAYNTER
PUTNAM VALLEY, NY

Just as computer software often contains errors, the same holds true for the programs stored in ROM that make a computer or disk drive work. One of the first bugs discovered in the 128 was the infamous Shift Lock Q problem. It printed a lowercase q whenever the Shift Lock key was depressed. There have been other problems, though less frequently encountered. Apart from the annoyance of a 1571's sputtering for minutes while trying to decide whether a disk is single or double sided, it also inherited the infamous Save-with-Replace bug. Volumes have been written about how the use of SAVE "@:filename",8, originally intended for replacing files without going through the longer process of scratch-



FEEDBACK

ing first and then saving, will sometimes trash programs. (Note: Placing a 0 after the @ sign usually corrects this problem.) ROM upgrades supply fixes to these and other problems. Upgrades usually are for the better, but often we discover that upgrades introduce their own problems.

Now to answer your second question. When submitting a program for publication, save it twice to disk along with two copies of the documentation in either SpeedScript or PET ASCII format. Enclose a printout of the documentation and mail it to Gazette Submissions Reviewer, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We encourage submissions of original games, utilities, and productivity programs for the 64 and 128, and we pay competitive rates for those we publish. If a program is too large to offer as a type-in program, we possibly can use it as a Gazette Disk bonus.

Empty Socket

I've noticed several ads for ROM upgrades for the 1571 and the 128. I've also noticed an empty socket inside my 128. What are these for? I am also interested in EPROM programming. I would appreciate any information you have on these subjects.

GARY R. PAYNTER
PUTNAM VALLEY, NY

That spare 28-pin socket which you noticed in the 128 can hold a custom EPROM (Erasable Programmable Read Only Memory) chip programmed with your own software. However, getting at it means voiding your warranty (if still in effect) and unsoldering the metal heat-sink/RFI shield. The socket can hold either a 16K or a 32K chip. If you insert a chip there, it will be recognized by the computer and treated like an external cartridge. Here are a few details.

There are two areas of 128 memory in which cartridges appear. They

are the mid-space (\$8000-\$BFFF) and the high-space (\$C000-\$FFFF). So up to 32K of cartridge memory can be switched into 128 memory space simultaneously.

Cartridge memory can be banked in through simple manipulation of the Memory Management Unit. (See your Commodore 128 Programmer's Reference Guide for details.) You can also program in a power-up autostart sequence.

To check for cartridges when the computer powers up, the system conducts a poll of all possible cartridge areas (internal or external, mid-space or high-space). This is done during the system RESET routine using a sub-routine called POLL, which is located at \$E242-\$E2BB in the Kernal (version 318020-03). In each of the cartridge areas, POLL checks for a special cartridge key string that begins seven bytes from the start of the area. For example, in the mid-space (\$8000-\$BFFF), POLL will start checking at

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FEEDBACK

\$8007. The cartridge key string on the 128 consists of the letters CBM. (The 64 checks for CBM80.)

In addition, the cartridge key contains cold and warm start entry points and a cartridge ID. If the CBM string is found, the POLL routine "logs in" the cartridge by recording its ID byte in a special table. This table is called the Physical Address Table, and it is located at \$0AC1-\$0AC4.

After storing an ID in the Physical Address Table and before checking the next area, POLL checks to see if the cartridge ID equals \$01. Any cartridge with this ID is considered to be an autostart cartridge. If this ID is detected, POLL immediately switches in the cartridge area and jumps to a sub-routine (JSR) for the cold start entry in the cartridge key.

The cold start entry is an entry point, not a vector. POLL JSRs directly to the cold start entry point, expecting to encounter executable machine code there. Normally this will be a jump (JMP) to the actual start of the cartridge code. The warm start entry is supposed to be set up the same way, but it's never used by the system.

Since POLL does a JSR to an autostart cartridge rather than jumping to it, the cartridge has a choice of whether it wants to return to POLL or not. If all the cartridge needs to do at this point is some initialization, it can do so and then return to POLL via an RTS command. If the cartridge wants to take over completely, it can do so by simply never returning to POLL.

The details of EPROM/cartridge use on the 128 are more involved than those for the 64, but they allow for more versatility.

Defunct Fonts

For the past three months I have been trying without success to obtain a copy of *Fontmaster* for my 128. I have approached U.K. suppliers without success. I have been told it is a U.S. product and used to be advertised regularly in *Gazette*. Can you help me locate a copy, or has the software been withdrawn?

GEORGE H. WEST
STOCKPORT, CHESHIRE
ENGLAND

Fontmaster II and *Fontmaster 128* were produced by Xetec in Salina, Kansas, but a company spokesperson says the products are no longer available. If you use GEOS and want to create fonts for your 128, you might try GEOS Font Editor (*Comm-Plex Software*, 6782 Junction Road, Pavilion, New York 14525; \$21.50). This program lets you create a new point size of any existing font and places 49 different fonts at your fingertips when writing a geoWrite document.

Another good font program is *Ultrafont+*, 1 of 14 utilities on the *Gazette Power Tools* disk (\$9.95).

ML for Beginners

I have recently started programming and have moved from BASIC to machine language. *Commodore 64 Programmer's Reference Guide* is the only book I have for ML programming. Is there a good book that helps beginners? Could you give me the name of a good assembler? Are there other languages available for the 64? If so, which ones?

Finally, I have noticed a few unfinished programs in *Programmer's Guide*. On page 111, I cannot find the

end of the last program on the page. Is there something I'm not doing, or has it been left out?

THOMAS UNDERHILL
SELANGOR, MALAYSIA

COMPUTE Books sells several beginner machine language books for the 64 and 128. Look for *Machine Language for Beginners* (\$16.95) and *The Second Book of Machine Language* (\$16.95). Both of these contain listings for machine language assemblers. *COMPUTE Books* also has valuable tools and references such as *Mapping the Commodore 64* (\$18.95) by Sheldon Leemon, *Mapping the Commodore 128* (\$19.95) by Ottis R. Cowper, and *Machine Language Routines for the Commodore 64/128* (\$18.95) by Todd D. Heimmarck and Patrick Parish. To order, write to *COMPUTE Books*, c/o CCC, 2500 McClellan Avenue, Pennsauken, New Jersey 08109. Please add \$2.00 shipping and handling charges for U.S. orders, \$4.00 for Canadian orders, and \$6.00 for all others. Also, watch for special book offers in *COMPUTE*.

All of the major computer languages are available for the 64 and 128. A partial list includes C, Pascal, COBOL, Fort, FORTRAN, Lisp, and Logo. One source of good-quality languages for the 8-bit Commodore line is *Abacus Software*, P.O. Box 7211, Grand Rapids, Michigan 49510.

The little program at the bottom of page 111 of *Commodore 64 Programmer's Reference Guide* redefines the character associated with the letter T, but only after you've moved your character set according to the longer program on the previous page. □



GEOS

S T E V E V A N D E R A R K

Commodore owners who use *GEOS* have a real advantage when the name of the game is graphics. They can call up two star players, *geoPaint*, one of the better bitmap manipulation applications, and *geoPublish*, probably the best of the desktop publishing packages.

There is very little that these two programs can't accomplish toward turning a document into a winner. From cut and paste to closed splines and scaled fonts, the results can be impressive. Documents can even be dumped to a laser printer for results that will score a hit every time.

Of course, every program strikes out once in a while, and the *GEOS* team has its holes in the lineup as well. The graphics objects created in *geoPublish* are not actually stored as bitmaps and are essentially unalterable at the pixel level, a convenience taken for granted in *geoPaint*. With *Paint Pages*, you can convert a *geoPublish* page into a *geoPaint* bitmap where pixel editing can be done. But there's no way to reverse the journey except by creating relatively small photo scraps and importing them one at a time back into *geoPublish*.

Even with the pagewide screen of *geoPaint 128*, this process will quickly run out the clock, and you'll still be left with the task of fitting the scraps back together. Sometimes it's easier just to patch an offending graphic with opaque, borderless white boxes and hope no one will notice.

It would also be nice if there were a way to copy a graphics object from one location to another on the *geoPublish* page. If you've ever tried to draw three identical curves using the spline tool, you'll know what I mean. While you can use the group select tool to move even a fairly complicated set of objects, there's no copy function built in. Your only recourse again is to convert the whole business into *geoPaint*.

GEOS users have a great second string to call on, though. There are a growing number of talented, imaginative programmers ready in the bullpen

to save the game. They've written utilities and desk accessories to fill in the gaps in the Berkeley lineup, programs that all *GEOS* users should have working for them. Some of these are available on QuantumLink or other BBSs, while one of the best showed up in this column a year and a half ago.

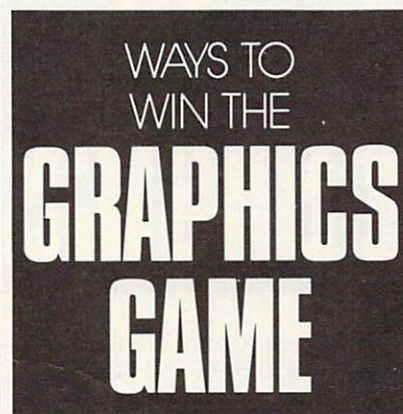
The small size of photo scraps is annoying with the limitations of a 40-column screen. Even with *GEOS 128's* 80-column version of the photo manager and *geoPaint*, the scraps are often too small for the job at hand. Terry Van Camp of Strongsville,

those great tools in *geoPublish*, use *Paint Pages* to convert it to *geoPaint*, detail and clean up the bitmap, and then use *Scrap It* to port it back into *geoPublish*. *Scrap It* is available from QuantumLink; it's shareware, so you should send a user fee of \$5 to Van Camp if you find his program useful. This utility is well worth that small amount of money.

Copying an object or group of objects in *geoPublish* is made possible by a clever little desk accessory published in this column last year (January 1990). It's called *Screen Grabber*, and with it any part of the screen is available for copying to a photo scrap. While there is only a limited need for bitmaps of sections of the desktop or the ruler in *geoWrite*, bitmap copies of graphics objects in *geoPublish* allow you to import any number of duplicates all over the page. A graphics construction you've layered together from various tools and fonts might be too complex for the group select function, but *Screen Grabber* simply copies the resulting hi-res image on your screen and turns the whole thing into a photo scrap that you can move around, scale up or down, or copy at will. *Screen Grabber* was written by Richard A. Rardin and appeared in the *GEOS* column in the January 1990 issue of *COMPUTE!'s Gazette*.

Anyone who plays the graphics game with *GEOS* needs these two files in the game plan. In my desktop publishing projects, I've found them to be invaluable. There are plenty of other great utilities out there, programs which offer the *GEOS* user new capabilities with the system. If you've found one that really hits a home run for you, let us know, and we'll pass the word along. In order for a program to be discussed, however, we must have complete information about the author and whether it's public domain, shareware, or available for sale. Write to me in care of this column.

Steve Vander Ark can also be reached on QuantumLink by sending E-mail to him. His handle is SteveV14. □



Ohio, has created *Scrap It*, a utility which neatly pinch-hits for the edit function in *geoPaint*. It lets you clip any size scrap you want from a *geoPaint* document. *Scrap It* displays a preview-style representation of a page from either drive and provides you with a set of brackets to set off any portion of it to be copied.

Need a full-page-wide letterhead for *geoWrite* but use the 40-column screen? No problem for *Scrap It*. Want to clip a usable chunk out of the middle of a ComputerEyes bitmap? It may overfill the *geoPaint* window, but it can't escape *Scrap It*!

There is no limit to the size of the scrap you create—the whole page can be grabbed this way. The only application that will accept a scrap that large, however, is *geoPublish*. But you can now create a graphics object using all



MACHINE LANGUAGE

J I M B U T T E R F I E L D

If I have a group of users interested in machine language, I sometimes publicly write a simple program. Beginners might not follow all the details of coding, but they will be presented with a few simple ideas: writing in machine language is a logical process no different from writing in another language, no magic is involved, knowledge of hexadecimal numbers and machine language monitors is required, and machine language programs can be dazzling.

If you are on the Commodore 128, use the built-in machine language monitor (MLM). Invoke it by pressing Shift-f8. Most other machines will need to load *Supermon+64*. Either way, we're invoking a new way of communicating with the computer. Instead of POKE and PEEK, we now can access more efficient commands.

If we were writing in BASIC, a place would be set aside for the program automatically. But with ML we'll have to choose a spot. This will be a short program, so it will fit almost anywhere. This time, I'll pick address 8192 (decimal).

Enter A +8192 . . . but don't press Return yet. We have said to the computer, "We wish to write (assemble) an instruction, to be located at decimal address 8192." The computer prefers a different style of number, hexadecimal, but it will accept the decimal value if you prefix it with a plus sign. Continue the line so that it reads A +8192 JSR . . . without pressing the Return key. We can now explain that JSR is the abbreviation (or mnemonic) for *Jump SubRoutine*, an instruction much like BASIC's GOSUB. It will call a subroutine, which will do some work for you, and then return to allow your program to continue. The subroutine we want is the one that will read a character from the keyboard. This routine is located at address \$FFE4 (hexadecimal). The character will be stored in the processor chip in an area called the *A register*, or the *Accumulator*. The dollar sign signifies a hexadecimal number.

Complete the line to read A +8192 JSR \$FFE4 but don't press Return yet. Note that we have asked the MLM to generate an instruction to go and fetch a character. Take a good look at this line; when you press Return, it will change dramatically.

BACK TO BASICS

Press Return. The line now says A 2000 20 E4 FF JSR \$FFE4. That's more or less what we entered, with some extra material. The decimal address 8192 has been changed to hexadecimal 2000, which the computer prefers. The translated instruction has become the three (hex) bytes 20 E4 FF, with the original printed at right.

The computer has calculated where the next instruction should go and has generated the first part of the line: A 2003. We've taken a character from the keyboard buffer. What should we do with it? We'll print it several times. We'll also need to count how many times we print the character. We'll use an area in the chip called the *X register* to do the counting. Start by setting the X register to zero with LDX (Load X): A 2003 LDX #0.

We use the # symbol to indicate that the zero is an actual value rather than an address. Programmers call this *immediate mode*. We'll print the character in the A register by calling an output subroutine with JSR

\$FFD2, and then we'll count by adding one to the X register with INX (INcrement X). In a moment, we'll want to go back and print (and count) again, providing our count (in X) has not yet reached 40.

A 2005 JSR \$FFD2
A 2008 INX
A 2009 CPX #+40

CPX is the instruction to ComPare X. We want to compare with the value 40, not the contents of address 40, so we use the # symbol again. The +40 means decimal 40; when you press Return, you'll see this converted to hexadecimal 28. By the way, if you're doing this on an 80-column machine, change the 40 to 80; on the VIC-20, use the value 22.

Since you have compared your count in X with a limit value, you can now say, "If it's not equal, go back and print again." That would be the BNE (Branch Not Equal) instruction.

A 200B BNE \$2005

Our character has now been printed 40, 80, or 22 times. Let's go back and do it again unless the character is an asterisk (\$2A, decimal 42). A CMP (CoMPare A) followed by a BNE will do the trick. (Always include a command to end the program).

A 200D CMP #\$2A
A 200F BNE \$2000
A 2011 RTS

Finally, RTS (ReTurn from Subroutine) signals the end of the program. If the machine language program was called from BASIC, it will return to BASIC. Press the X key and Return to return to BASIC from the MLM. Now invoke the program with SYS 8192.

As quickly as you can, type a message like *NOW IS THE TIME*. The message fills the screen at dazzling speed. Conclude by pressing the asterisk key, and the program will return to BASIC. □



BEGINNER BASIC

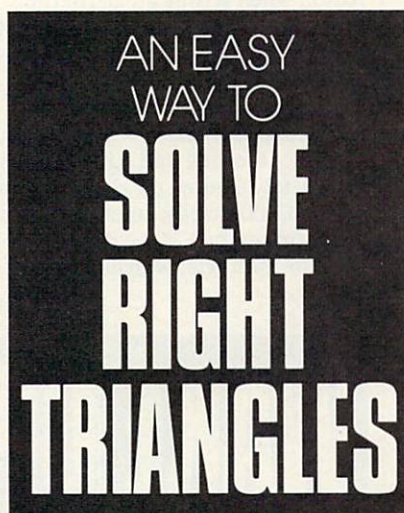
L A R R Y C O T T O N

We're going to do something a little different this month. First I'll present a program; then we'll discuss it. This one quickly solves any right triangle.

To avoid typing errors, use *The Automatic Proofreader* to enter this program. Remember, the up arrow with the line beneath it indicates you should press the Shift key and the up arrow simultaneously. This prints pi.

```
AM 10 PRINTCHR$(147)
HS 20 POKE53280,12:POKE53281,1
5:POKE646,1
DJ 30 PRINTTAB(28)"{2 DOWN}
{GRN}RIGHT
HC 40 PRINTTAB(28)"TRIANGLE
KE 50 PRINTTAB(28)"SOLVER
JR 60 PRINTTAB(28)"-----
{6 UP}{WHT}
DE 70 FORT=1TO14:PRINTTAB(11)C
HR$(170):NEXT
HP 80 PRINT"HOME"
CQ 90 FORT=12TO25:PRINTTAB(T)C
HR$(205):NEXT
GK 100 POKE214,14:PRINT
BE 110 FORT=12TO25:PRINTTAB(T)
CHR$(183);:NEXT
RE 120 FORT=1TO3:READY,X,A$
KG 130 POKE214,Y:PRINT:POKE211
,X:PRINT"RED"AS:NEXT
FG 140 FORT=1TO3:READY,X,A$
ES 150 POKE214,Y:PRINT:POKE211
,X:PRINT"BLU"AS:NEXT
BE 160 DATA3,13,A,12,13,C,12,2
2,B,7,9,BB,6,21,CC,15,1
7,AA
HJ 170 C=90:REM ALWAYS RIGHT A
NGLE
KD 180 INPUT"{DOWN}{RED}
{2 SPACES}ANGLE A";A:IF
A>89ORA<0THENRUN
RB 190 IFATHENB=180-C-A:N=N+1:
GOTO220
QG 200 INPUT"{2 SPACES}ANGLE B
";B:IFB>89ORB<0THENRUN
CB 210 IFBTHENA=180-C-B:N=N+1
RQ 220 POKE214,20:PRINT
RQ 230 INPUT"BLU">{2 SPACES}SI
DE AA";AA:IFAATHENN=N+1:
IFAATHEN300
HM 240 INPUT"BLU">{2 SPACES}SI
DE BB";BB:IFBTHENN=N+1:
IFAATHEN300
HB 250 IFAATHENIFBTHEN300
MF 260 IFN<1THENRUN
PB 270 INPUT"BLU}
{SHIFT-SPACE}SIDE CC";C
C:IFCCTHENN=N+1
DG 280 IFCC<BBORCC<AATHENRUN
GJ 290 IFN<2THENRUN
RH 300 IFAATHENIFBTHENCC=SQR(
AA^2+BB^2):GOTO360
```

```
GS 310 IFAATHENIFCCTHENBB=SQR(
CC^2-AA^2):GOTO360
MB 320 IFBTHENIFCCTHENAA=SQR(
CC^2-BB^2):GOTO360
KX 330 IFAATHENCC=AA/SIN(A*^/1
80):BB=SQR(CC^2-AA^2):G
OTO370
```



```
XX 340 IFBTHENCC=BB/COS(A*^/1
80):AA=SQR(CC^2-BB^2):G
OTO370
CQ 350 IFCCTHENAA=CC*SIN(A*^/1
80):BB=SQR(CC^2-AA^2):G
OTO370
MF 360 A=ATN(AA/BB)*180/^:B=18
0-C-A
SR 370 POKE214,17:PRINT
QM 380 TB=22
BQ 390 N=A:GOSUB470:PRINTTAB(T
B)"{RED}ANGLE A ="T
PK 400 N=B:GOSUB470:PRINTTAB(T
B)"ANGLE B ="T
RE 410 N=C:GOSUB470:PRINTTAB(T
B)"ANGLE C ="T
AB 420 N=AA:GOSUB470:PRINTTAB(
TB)"{BLU}SIDE AA ="T
FA 430 N=BB:GOSUB470:PRINTTAB(
TB)"SIDE BB ="T
GS 440 N=CC:GOSUB470:PRINTTAB(
TB)"SIDE CC ="T
KG 450 GETAS:IFAS<>CHR$(13)THE
N450
GQ 460 RUN
HR 470 T=INT(N*100+.5)/100:RET
URN
```

You don't have to know a thing about trigonometry to use this program. Simply enter values at the prompts. Angles must be in degrees. Sides may be in any unit (feet, inches,

millimeters) as long as they are the same units. If you don't know a value, press Return. The computer will ask for enough information to solve the triangle and then print to the screen all three angles and sides. Press Return to solve another triangle.

Lines 180 and 200 look for legitimate angles and line 280 checks to see that side lengths make sense. It doesn't matter whether side AA or BB is larger, but make sure that CC (the hypotenuse) is the longest side. Be sure you don't enter letters when the computer is expecting numbers. If a value doesn't make sense or too little information is presented, the program just starts over. An IF-THEN statement is used quite a bit to check whether information has actually been entered. For instance, in line 190, IF A THEN . . . simply checks to see whether angle A is anything other than 0. In other words, IF A now has a value, THEN do something.

A counter (N) is used to ensure that enough information has been entered to solve the triangle. N is first encountered in line 190. As information is entered, N is incremented and then checked in line 260 and/or line 290. Two pieces of data must be entered to solve a triangle.

I think you can figure out what most of the other lines do, but there are two functions that we haven't covered lately: COS (line 340) and ATN (line 360).

COS (cosine) is similar to SIN (sine), except that it works with a triangle's adjacent side and hypotenuse. In line 340, COS calculates side CC when BB and angle A are known.

Think of ATN (arc tangent) as the opposite of TAN (tangent). The tangent of an angle is the angle's opposite side divided by its adjacent side. ATN is used to determine an angle when the opposite and adjacent sides are known. In line 360, ATN is used to calculate angle A when AA and BB are known.

Finally, line 470 is a simple subroutine which rounds numbers to two decimal places. □



PROGRAMMER'S PAGE

R A N D Y T H O M P S O N

The 64 has not one, not two, not three, but six different hardware timers. And thanks to these timers, graciously provided by the computer's two Complex Interface Adapter (CIA) chips, the 64 is guaranteed punctual operation.

Among the most useful of the CIA chip timers is the Time of Day (TOD) clock. Besides keeping an accurate account of the time of day, this clock has an alarm function that operates very much like the alarm found in your clock radio. To exploit the TOD clock's abilities and to demonstrate its ease of use, I created a short alarm clock program to keep the computer's biological peripheral—that's you!—running on schedule.

As with a normal alarm clock, the following program allows you to set both the TOD clock's current time and alarm time. After that, the clock runs in the background while you are free to continue writing programs, playing computer games, or napping in your computer chair waiting for the alarm to go off. When alarm time comes around, the computer halts what it is doing, and the screen's border appears to come alive. Press the back-arrow key located in the upper left corner of the keyboard to turn the alarm off. The border will stop strobing, and the computer will continue where it left off.

When you run the program, it prompts you for the current time and the time you want the alarm to sound. Enter these times in HHMMSS (Hours, Minutes, Seconds) format. For example, if it is 2:35 and 10 seconds, enter 023510. After entering each time, the program asks you to press the A key for a.m. or the P key for p.m. Once both times have been entered, you can erase this BASIC program and use the computer for almost any purpose without disabling the alarm. The alarm is vulnerable to programs that steal the computer's IRQ vector or use memory in the range 828-889. In effect, such programs will place your alarm clock into permanent "snooze" mode.

I discovered a couple of bugs in the TOD clock's alarm function while developing this program. If the current time is between 12:00 and 1:00 (a.m. or p.m.), you must give the computer the incorrect a.m. or p.m. designation when setting an alarm time that is within the same hour. So if it's 12:05 p.m. and you want the alarm to sound in 25 minutes at 12:30, you must set the alarm for 12:30 a.m. If you don't, your alarm will be 12 hours off. Also, the a.m. and p.m. setting is completely ignored on alarms that are set for 12:00 exactly. In other words, an alarm set for 12:00 will go off at noon or midnight, whichever is sooner.

WAKE UP TO ALARMING SOFTWARE FOR YOUR 64

Memory locations 56328-56331 (\$DC08-\$DC0B) are the TOD clock's registers. These registers store the time in the following format:

Register	Purpose
56328 (\$DC08)	Tenths of seconds
56329 (\$DC09)	Seconds
56330 (\$DC0A)	Minutes
56331 (\$DC0B)	Hours

The time is kept in binary code decimal (BCD). In BCD, a byte is divided into two groups of four bits, known as a *nybble*. Each nybble represents one decimal digit. For example, at 12:00, the hours register (memory location 56331) contains a binary value of 00010010. Dividing this byte into nybbles, we get 0001 and 0010, representing the decimal digits 1 and 2 for 12. All of the TOD clock regis-

ters work this way. The high bit (the leftmost binary digit) of the hours register indicates either a.m. or p.m. This bit is equal to 1 if it's afternoon or 0 if it's morning.

These registers have a unique latching feature. When you read the hours register with a BASIC PEEK command or a machine language load instruction, all of the registers freeze (hold on to their current value) until you read the tenths-of-seconds register. This prevents you from receiving an inaccurate reading. For example, if you read the hours register at 11:59 and the time changes to 12:00 just before you read the minutes register, the latching feature prevents you from reading the time as 11:00 instead of 11:59. Although the registers' values freeze, the CIA chip's internal TOD clock keeps ticking away. So the moment you read the tenths-of-seconds register, all the registers are updated to reflect the proper time.

By writing to the TOD clock registers, you accomplish one of two tasks—you either set the clock or the alarm time. To specify which time you set, you manipulate the high bit of memory location 56335 (\$DC0F). If you set the high bit equal to 1, writing to the clock registers sets the alarm time. To set the time of day, you clear the high bit. Lines 110 and 130 of the program above perform this duty using BASIC's AND and OR operators.

The subroutine located in lines 180-270 sets both the clock time and alarm time. Lines 190-200 receive and verify your input. Line 210 stores this input into a numeric array of single digits. Lines 250-260 use this array to poke the time into the TOD registers in BCD format. The *AP* variable signifies a.m. or p.m.

Once the program sets the TOD clock, line 150 turns on the alarm using the command POKE 56333,4.

TOD clock alarms generate an interrupt request, which normally forces the computer to execute the interrupt routine located in ROM at memory location 59953 (\$EA31). In order for



PROGRAMMER'S PAGE

the alarm program to know that an interrupt occurred, I use a short machine language routine to intercept the normal interrupt routine. This machine language routine is stored in the DATA statements in lines 340-370.

It's the job of the new interrupt routine to determine why the computer has disturbed its otherwise peaceful existence. (Interrupts, which normally occur at least 60 times a second, can be caused by several events.) If the TOD clock alarm is not the cause of the interrupt, then program control is passed along to the 64's normal interrupt routine. If the TOD clock alarm is the culprit, then the border is placed into a psychedelic frenzy until the back-arrow key is pressed or the computer's power is cut off—a rude but effective technique for terminating obnoxious computer behavior.

ALARM

```
GM 100 SA=828:GOSUB 280
CH 110 POKE 56335,PEEK(56335)
```

```
{SPACE}AND 127:REM GET
{SPACE}READY TO SET TIME
E
KX 120 PRINT "{CLR}ENTER TIME (
HHMMSS)":GOSUB 180
MX 130 POKE 56335,PEEK(56335)
{SPACE}OR 128:REM READY
TO SET ALARM
AC 140 PRINT "{CLR}SET ALARM TIME
(HHMMSS)":GOSUB 180
XA 150 POKE 56333,4:REM TURN A
LARM ON
FB 160 SYS SA:PRINT "{CLR}ALAR
M SET"
RA 170 END
MA 180 REM ENTER AND SET TIME
BC 190 PRINT "{HOME}"TAB(26):
INPUT TS:IF LEN(TS)<>6
{SPACE}OR VAL(LEFT$(TS,
2))<1 THEN 190
GH 200 IF VAL(TS)>129999 OR VAL
(MID$(TS,3,2))>59 OR VAL
(RIGHT$(TS,2))>59 THEN
N 190
PE 210 FOR I=1 TO 6:T(I)=VAL(M
ID$(TS,I,1)):NEXT
KB 220 PRINT "AM OR PM (A/P)?"
;
AG 230 GET KS:IF KS<>"A" AND K
S<>"P" THEN 230
RC 240 PRINT KS:AP=0:IF KS="P"
THEN AP=128
CG 250 POKE 56331,(T(1)*16+T(2
```

```
)) OR AP:POKE 56330,T(3
)*16+T(4)
JP 260 POKE 56329,T(5)*16+T(6)
:POKE 56328,0
GH 270 RETURN
FQ 280 REM STORE MACHINE LANGUAGE
DATA
BF 290 CK=0:FOR I=SA TO SA+61:
READ D:POKE I,D:CK=CK+D
:NEXT
MX 300 IF CK<>7121 THEN PRINT
{SPACE}"ERROR IN DATA S
TATEMENTS":END
XF 310 HB=INT((SA+13)/256):LB=
SA+13-HB*256:POKE SA+2,
LB:POKE SA+7,HB
XM 320 RETURN
XM 330 REM MACHINE LANGUAGE DATA
DS 340 DATA 120,169,060,141,02
0,003,169,003,141,021,0
03,088,096
CM 350 DATA 173,013,220,041,00
4,240,039,141,013,220,1
73,032,208,072,238,032,
208
AD 360 DATA 032,159,255,165,19
7,201,057,208,244,104,1
41,032,208,169,000,133,
198
BF 370 DATA 120,169,049,141,02
0,003,169,234,141,021,0
03,088,076,049,234
```

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D'IVERSIONS

F R E D D ' I G N A Z I O

We are what we dream. Our dreams of "futures past" now seem wholesome and desirable compared to today's sometimes cockeyed present.

In the 1950s when I was growing up, kids dreamed about the hot new toys of technology: TV sets, space-ships, monster computers, and transistor radios. We tuned in to family programs every night like "Dennis the Menace," "Father Knows Best," "Ozzie and Harriet," and "Lassie." We identified with the kids on the programs—kids like Bud, Frank, Ricky, Dennis, Margaret, Timmy, and Betty. We dreamed of a fantastic future—a George Jetson future where families would be just like those we saw on our favorite TV programs. Life would be a lot the same—comfortable, loving, funny, and so on. But in the future we'd also have tons of high-tech toys, just like Judy and Elroy Jetson had.

We'd have a robot. We'd have a jet car. We'd have picture phones and cosmic baseball. And we'd never have to do any work because we'd have homework machines, machines to take out the trash, machines to wash the dirty dishes and pick up our bedrooms. In the future, life would be grand!

Then something sad happened. Somewhere between 1950 and 1990, we kids wandered off the yellow brick road to the Jetson future, and we never found our way back. The TV families of the 1950s were replaced by the TV families of the 1990s—"Rosalie," "Married with Children," "The Simpsons." Families fragmented into latchkey kids, liberated women, and workaholic dads. In place of Donna Reed, kids came home to revolving-door parents and Nintendo babysitters.

Welcome to the postmodern world. A world beyond Walt Disney and George Jetson. A world of AIDS, Madonna, MTV, Ninja Turtles, WrestleMania, and *Nightmare on Elm Street*. In place of Jetson jet cars and robots, the landscape is dotted with cellular phones, Game Boys,

palmcorders, DAT Man, and CDTV.

The Jetsons movie came out recently. If you saw the film, didn't you think it seemed a little odd, a little quaint? That's because the Jetsons movie is a leftover, warmed-over dream. It's a vision of a future past. The truth is that somewhere between 1950 and 1990 the real George Jetson walked out on his kids, his dog Astro, his gadgets, his wife Jane—and he never returned.

In the 1950s we pulled up to a Texaco station, and the man who wore the star rushed out with a great big smile and served us and serviced our car. In the 1990s we roll into a

new ovens. We were sure that all that glowing white enamel was just the tip of a technological iceberg. Our high-tech home of the future would be clean, sleek, and, and cozy. And above all, American!

Cancel that dream. Technology tomorrow turned out to be tiny black boxes from Japan and Korea. The easy street to the future turned into a shortcut to the salt mines.

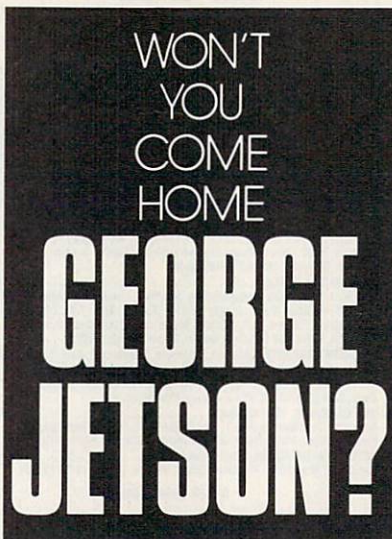
In the 1950s we looked forward to a future in which machines did most of the work. We were told to expect more leisure time, shorter work weeks, and a carefree existence. The George Jetson easy street was just around the corner. Technology would save us so much work that we'd have time on our hands.

Now we're in the 1990s, the decade of time deprivation. Husbands and wives both work full-time jobs. Life is a rat race. The streets and the skies are gridlocked by too many vehicles trying to travel to too many places. Technology has turned from slave to taskmaster. With fax machines, cellular phones, E-Mail, phone mail, overnight delivery services, video conferencing, and computers, we are never out of touch. We are never offline. We must never stop, slack off, or daydream. We are plugged into a network that never sleeps. We feel unrelenting pressure to work all the time. Our machines quietly goad us to work harder, faster, longer. Puff! Puff! Puff!

Our present is not necessarily better or worse than the old Jetson future. It's definitely different.

Editor's note: Don't forget to enter Fred D'Ignazio's Design-a-Robot contest. See last month's "D'Iversions" for a complete list of the rules.

All entries must be received by August 31, 1991. The first-place winner will receive a model robot valued at \$200; five runners-up will each receive a smaller robot valued at \$30. Send entries to Design-a-Robot Contest, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □



stark gasoline fortress and see hulking vandal-proof pump-it-yourself vending machines. We pay our money to a shadowy presence hidden behind protective layers of bulletproof glass, and we pump our gas through an accordion vapor-control hose that looks like an appendage of Robbie the Robot in *Forbidden Planet*.

In the 1950s kids and their parents went ga-ga over the shiny white appliances that poured out of America's postwar factories and into America's homes. There were new refrigerators, new washing machines, and



PROGRAMS

B I L L F I S H E R

If you enjoy solving cryptogram puzzles that appear in many newspapers, you'll find *Crypto-64* a very useful and entertaining program. Amateur code breakers can use it to practice solving letter-substitution ciphers.

Crypto-64 doesn't actually solve the puzzle for you. Instead, it provides a convenient display of both the original cryptogram and the resulting decoded version as you enter various character substitutions.

Getting Started

Crypto-64 is written entirely in BASIC. To help prevent typing errors, use *The Automatic Proofreader* to type it in; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program when you've finished typing.

Solving Puzzles

Load and run the program. At the prompt enter a cryptogram in up to four one-line parts. Be sure to press the Return key before moving to a new line. You'll then be prompted to continue with the next part. It's necessary to limit each part of the cryptogram to one line in order to provide for proper onscreen presentation. If your cryptogram occupies less than four lines, merely press the Return key to skip the unused part(s).

Your cryptogram will then be displayed with an asterisk (*) below each letter. You'll be prompted to select CHAR, RESTART, or QUIT by pressing C, R, or Q, respectively. When you decide to substitute a new character for one in the cryptogram, press C, enter the letter you want to change, and press Return. At the next prompt, SUB, enter the letter you wish to try as a substitute. Press Return, and the screen will then redisplay the original cryptogram with the substituted letter printed below the line in the appropriate location.

If you wish to change one of your substituted letters after you see the display, merely reenter the original cryptogram letter at the CHAR

prompt and try your new substitution at the SUB prompt. If you enter an asterisk as the substitute character, you can effectively erase any previous substitution.

If at some point you wish to start again with the same cryptogram, select R (for RESTART) at the prompt. The original cryptogram will be displayed with no substituted letters. To quit, select Q at the prompt.

Because INPUT statements pro-

CRYPTO-64

CRACK CODES
AND SOLVE
CRYPTOGRAMS WITH
THE HELP OF THIS
SHORT UTILITY FOR
THE 64

hibit entering a comma or a colon, do not use either of these punctuation marks. If they do appear in the original cryptogram, they should be omitted. If you wish, however, you may replace commas and colons with alternative characters.

Here's a sample cipher to get you started. After you run the program, enter the four lines of scrambled text. When you're ready to solve the puzzle, substitute the letter T for the letter Z as shown below. Now try substituting E for T and A for Q.

DQKN IQR Q SOZZST SQDW OZL
**** * * * * T * * * * * T *

YSTTET VQL VIOZT QL LFGV
***** * * * * T * * * * *

QFR TCTKNVITKT ZIQZ DQKN VTFZ
*** * * * * T * * * * * T *

ZIT SQDW VQL LXKT ZG UG
T * * * * * T * * * * *

CRYPTO-64

```
BE 1 REM COPYRIGHT 1991 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
QM 10 CS=CHR$(147):R$=CHR$(29)
    :US=CHR$(145):DIML$(145)
MS 20 PRINTCS:FORQ=32TO64:L$(Q
    )=CHR$(Q):NEXT:L$(91)=CH
    R$(91):L$(145)=CHR$(145)
BF 30 PRINT:PRINT"CRYPTOGRAM L
    INE 1:"PRINT:INPUTW$:LW
    =LEN(W$):IFLW=0THENW$=US
RA 40 PRINT:PRINT"CRYPTOGRAM L
    INE 2:"PRINT:INPUTX$:LX
    =LEN(X$):IFLX=0THENX$=US
MX 50 PRINT:PRINT"CRYPTOGRAM L
    INE 3:"PRINT:INPUTY$:LY
    =LEN(Y$):IFLY=0THENY$=US
AJ 60 PRINT:PRINT"CRYPTOGRAM L
    INE 4:"PRINT:INPUTZ$:LZ
    =LEN(Z$):IFLZ=0THENZ$=US
FG 70 PRINTCS:FORQ=65TO90:L$(Q
    )="*":NEXT:IFW$=U$THEN20
DK 80 PRINT:PRINT:PRINT:K$=W$:
    P=LW:GOSUB250
EJ 90 K$=X$:P=LX:GOSUB250
JA 100 K$=Y$:P=LY:GOSUB250
JC 110 K$=Z$:P=LZ:GOSUB250
HF 120 GOSUB270:GOTO220
FP 130 PRINT:AS$="":PRINT" CHAR
    ";:INPUTAS$:IFAS$=""THEN
    {SPACE}PRINTCS:GOTO160
FH 140 BS$="":PRINT" {2 SPACES}S
    UB";:INPUT BS$:IFBS$=""TH
    ENAS$="":PRINTCS:GOTO160
BR 150 N=ASC(AS):L$(N)=BS
XX 160 PRINTCS:PRINT:PRINT:PRI
    NT
CP 170 K$=W$:PRINTR$+K$:P=LW:G
    OSUB260
XR 180 K$=X$:PRINTR$+K$:P=LX:G
    OSUB260
JS 190 K$=Y$:PRINTR$+K$:P=LY:G
    OSUB260
AA 200 K$=Z$:PRINTR$+K$:P=LZ:G
    OSUB260
MX 210 GOSUB270
JD 220 IFSS$="R"THEN GOSUB280:P
    RINT:GOTO70
CB 230 IFSS$="Q"THEN GOSUB280:P
    RINTCS:END
PB 240 GOTO130
FS 250 PRINTR$+K$
KH 260 PRINTR$;:FORN=1TOP:A=AS
    C(MID$(K$,N,1)):PRINTL$(
    A);:NEXT:PRINT:PRINT:R
    ETURN
GQ 270 POKE198,0:PRINT:PRINT:P
    RINT" CHAR,RESTART,QUIT
    (C/R/Q)":INPUT SS:RET
    URN
AA 280 POKE198,0:PRINT:PRINT"
    {SPACE}ARE YOU SURE (Y/
    N)":INPUT SS
AE 290 IFSS<>"Y"THENPRINTCS:GO
    TO160
HJ 300 RETURN
```




PROGRAMS

R I C H A R D P E N N

For an effective video presentation, good graphics alone are not enough. To catch a viewer's attention, you must present your images with style—move them on and off a screen with flair and imagination.

Television news is packed with visually exciting wipes, overlays, and fades. *Simulvideo* brings the power of such video manipulation to the 64.

This utility supports a multitude of smooth and fast graphics effects. Large dual bitmaps can converge from opposite directions, interlace, blend together, and then reverse the effect. Two different bitmaps, such as a logo and a slate, can merge over each other. Bitmaps can be wiped on and off. Once onscreen, they can be made to wave in different ways, and text can be displayed in front of or behind them. A backdrop can also fade in and out.

With a new overlay mode, a bitmap is not limited to being over or under different graphics; it can be layered in between. A demonstration and a short supporting utility for converting hi-res graphics to *Simulvideo* format round out this video package.

Getting Started

Simulvideo consists of three programs. The main program is written entirely in machine language. To enter it, you'll need to use *MLX*, our machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000

Ending address: CB7F

When you've finished typing, be sure to save the program to disk as *SIMULVIDEO.OBJ* before exiting *MLX*.

The second program demonstrates *Simulvideo* effects and is written in BASIC. Type it in using *The Automatic Proofreader*; see "Typing Aids" again. When you've finished typing, save this program as *SIMUL-*

VIDEO.DEMO to the disk with *SIMULVIDEO.OBJ*. To see some of the effects possible with *Simulvideo*, load and run the demo program. It automatically calls *SIMULVIDEO.OBJ*. After it demonstrates several effects, press the space bar to see others.

The third program, *IMPORT*, is a BASIC utility for importing multicolor graphics from paint programs to *Simulvideo*. Type it in with *The Automatic Proofreader* as well, and save it to the disk with *SIMULVIDEO.OBJ* and *SIMULVIDEO.DEMO*.

To use *Simulvideo* in your own programs, add line 50 of the demo to the beginning of your program.

SIMULVIDEO

ADD WIPES,
OVERLAYS, FADES,
AND OTHER SPECIAL
EFFECTS TO YOUR
64'S GRAPHIC
PRESENTATIONS

Program Commands

Simulvideo uses raster interrupts and sprites to simulate two multicolor bitmaps 48 pixels wide and 168 pixels down. These two bitmaps work in tandem with special memory manipulation to create the special effects.

Usually such interlacing animation requires extensive memory moving, something the 64 is too slow to do on the fly. However, because the bitmaps are actually sprites—and sprites are directly supported by hardware—the video can be processed quickly and smoothly.

Simulvideo incorporates 17 video commands, many of which have several options. To access them, use the

SYS commands described below. They are available in direct mode or from within a program.

SYS 51071, c1, c2, c3

This command, which must be called before any others, activates *Simulvideo* and selects the three bitmap colors (0–15). Be careful not to recall this command once *Simulvideo* is enabled, or the computer will crash.

SYS 51589, "filename", location

This command loads a bitmap from disk into the specified memory location 0–7 (stored under ROM). A maximum of eight bitmaps can be stored in memory at any time, but new bitmaps can be loaded to overwrite existing ones as required.

SYS 51388, type, left bitmap, [right bitmap]

This command, which must be called before any of the bitmap manipulation commands, selects the bitmap to use. The type parameter is 0 for interlace effects or 1 for solid effects. The bitmap parameter is the location where the bitmap was loaded (0–7). For interlace effects use only one bitmap, such as *SYS 51388, 0, 1*. For solid effects, the left and right bitmap panels can be different, so you must select the graphics for both bitmaps (*SYS 51388, 1, 5, 6*). The bitmap commands below will indicate which type they are and how many bitmaps they need.

SYS 50740, merge type

This performs an interlaced bitmap merge, where the merge type is 0 for a horizontal interlace and 1 for a vertical interlace. One bitmap must be specified for this command (*SYS 51388, 0, bitmap*).

SYS 50746, spread type

This performs an interlaced bitmap spread, where the spread type is 0 for a horizontal interlace and 1 for a vertical interlace. One bitmap must be specified for this command (*SYS 51388, 0, bitmap*).

PROGRAMS

SYS 51569

This simultaneously slides two solid bitmaps together without interlacing them so that the left panel appears on top of the right one. This effect is good for sliding a large logo over a slate or text over a backdrop. Alternately, if the left bitmap has a picture in the upper half and the right bitmap has a picture in the lower half, this command can make two separate pictures slide onscreen one above the other (similarly, pictures can slide side by side if they are narrow). Two bitmaps must be specified for this command (SYS 51388, 1, *left bitmap*, *right bitmap*).

SYS 51579

This command simultaneously slides two solid bitmaps apart without interlacing them. Two bitmaps must be specified for this command (SYS 51388, 1, *left bitmap*, *right bitmap*).

SYS 51725, *direction*

This wipes a single bitmap onto the screen. The bitmap can scroll on from the left side (direction 0) or from the right side (direction 1). One bitmap must be specified for this command (SYS 51388, 0, *bitmap*).

SYS 51750, *direction*

This wipes a single bitmap off the screen. The bitmap can scroll off to the right (direction 0) or to the left (direction 1). One bitmap must be specified for this command (SYS 51388, 0, *bitmap*).

SYS 50752, *size, exit*

This creates a wave effect over the bitmap. There are four wave sizes, which range from small to large (0-3). To exit the effect, press the space bar or the fire button on a joystick plugged into port 1. The end parameter selects whether the bitmap will remain onscreen after it is stopped (exit 0) or will spread apart with the last used interlace pattern (exit 1). This command will only work following an interlaced bitmap merge (SYS 51071, *merge type*).

SYS 50916

This toggles the bitmap priority so it appears either in front of or behind text. By default, a bitmap is displayed in front of text whenever *Simulvideo* is activated.

SYS 50930

This toggles the entire screen on and off. The border and screen must be the same color. This command is invaluable when setting up new screens. By turning off the video, a new screen can be printed without the user's seeing it. When the video is restored, only the completed screen is seen.

SYS 51879

This fades a diagonally lined backdrop into view. For a pleasing effect, the screen and border must both be black.

SYS 52024

This fades out the backdrop. As above, the screen and border must be black.

SYS 50946, *c1, c2, c3*

This turns on overlay mode and determines the three colors to use (0-15). Its basis is the extended background color mode, so graphics must be designed with reversed spaces.

In overlay mode, a shifted space character prints in color 1, a reversed space in color 2, and a reversed shifted space in color 3. These characters make up layer 2 graphics.

The @ character is redefined to print solid spaces and can be printed in any of the 16 available colors by including color codes within a print statement as usual, such as PRINT "[WHT]@". This character makes up layer 1 graphics.

The bitmap always appears in front of layer 1 graphics (the extended background color mode made up of reversed spaces). Layer 2 graphics (@ characters) are special. Depending on the bitmap priority, the bitmap can either appear in front of or behind these characters. To see this in practice, the red flag in the demo is printed with reversed spaces, and the blue flag with @ characters.

SYS 50980

This turns off overlay mode.

SYS 50986

This command disables *Simulvideo*. Always use this command to exit. Do not use Run/Stop-Restore.

Video Considerations

The PRINT command works slightly differently with *Simulvideo*. It's slow-

er, and the TAB and SPC commands do not work (use cursor right controls instead). Also, the screen cannot scroll. Although you can print from anywhere within a program, in direct mode your typing will only be visible in a small strip near the top of the screen.

To design *Simulvideo* graphics, use a multicolor paint program and draw in three colors in the upper left area of the screen (48 pixels across by 168 pixels down). Save this screen to disk; then load and run the bitmap importer utility and answer the prompts as requested. It will create a separate graphics file on disk which can be loaded with *Simulvideo's* graphics load command (SYS 51589, "filename", loc 0-7) and used in your programs. Note that converted graphics will be twice as wide as the original ones.

Although you don't have to worry about memory locations with *Simulvideo*, programmers should note that all of Bank 1 (16384-32767) is used by the VIC-II chip. The ML routine is stored at locations 49152-52088, and the bitmaps loaded from disk are stored under Basic and Kernel ROM.

By today's video standards, how you display something is almost as important as what you display. With *Simulvideo*, this is no longer a problem.

SIMULVIDEO.OBJ

```
C000:78 A9 7F 8D 0D DC A9 01 21
C008:8D 1A D0 A9 28 8D 12 D0 F7
C010:A9 1B 8D 11 D0 A9 21 8D EC
C018:14 03 A9 C0 8D 15 03 58 C4
C020:60 A9 01 8D 19 D0 A5 02 8E
C028:18 69 05 A2 10 9D FF CF A1
C030:CA CA D0 F9 AE EA C9 BD F5
C038:EB C9 AA EA CA D0 FC 4C 06
C040:42 C0 AE EA C9 BD F3 C9 8E
C048:8D 18 D0 EE EA C9 A5 02 6B
C050:18 69 15 C9 D3 B0 0B 8D 7C
C058:12 D0 85 02 68 A8 68 AA 49
C060:68 40 A9 3E 8D 12 D0 85 1B
C068:02 A9 00 8D 02 D0 8D 0A 37
C070:F0 EA 4C 31 EA A9 00 85 45
C078:FB A9 58 8D 00 D0 8D 08 AC
C080:D0 A9 88 8D 02 D0 8D 0A 37
C088:D0 A9 B8 8D 04 D0 8D 0C 57
C090:D0 A9 E8 8D 06 D0 8D 0E 77
C098:D0 A9 FF 8D 10 D0 8D 01 3B
C0A0:CB EA A9 FF 8D 15 D0 EB
C0A8:AD 11 D0 10 FB EE 00 D0 CC
C0B0:EE 02 D0 EE 04 D0 EE 06 7A
C0B8:D0 CE 08 D0 CE 0A D0 CE 73
C0C0:0C D0 CE 0E D0 AE 00 D0 49
C0C8:E0 70 D0 08 AD 10 D0 29 E9
C0D0:F7 8D 10 D0 E0 A0 D0 08 F3
```




PROGRAMS

C0D8:AD	10	D0	29	FB	8D	10	D0	E8	C340:C9	A9	03	8D	EC	C9	A9	03	35	C5A8:A9	00	91	FD	C8	91	FD	C8	6C
C0E0:E0	D0	D0	08	AD	10	D0	29	1A	C348:8D	ED	C9	A9	09	8D	EE	C9	0C	C5B0:91	FD	C8	C8	C8	C8	C0	3C	
C0E8:FD	8D	10	D0	E0	00	D0	08	8C	C350:A9	03	8D	EF	C9	A9	03	8D	A6	C5B8:D0	F0	EE	FB	C9	E8	E0	04	
C0F0:AD	10	D0	29	FE	8D	10	D0	19	C358:F0	C9	A9	09	8D	F1	C9	A9	02	C5C0:D0	CE	EE	FB	C9	EE	FB	C9	
C0F8:AE	08	D0	E0	FF	D0	08	AD	FC	C360:03	8D	F2	C9	4C	00	C0	8E	3A	C5C8:EE	FB	C9	EE	FB	C9	AD	FB	
C100:10	D0	29	EF	8D	10	D0	E0	13	C368:F8	43	E8	8E	F9	43	E8	8E	80	C5D0:C9	C9	DD	90	B9	60	A9	00	
C108:CF	D0	08	AD	10	D0	29	DF	79	C370:FA	43	E8	8E	FB	43	E8	8E	99	C5D8:85	FD	A9	68	85	FE	A0	00	
C110:8D	10	D0	E0	9F	D0	08	AD	84	C378:F8	47	E8	8E	F9	47	E8	8E	A1	C5E0:B1	FD	29	33	91	FD	E6	FD	
C118:10	D0	29	BF	8D	10	D0	E0	28	C380:FA	47	E8	8E	FB	47	E8	8E	BA	C5E8:D0	02	E6	FE	A5	FE	C9	70	
C120:6F	D0	08	AD	10	D0	29	7F	01	C388:F8	4B	E8	8E	F9	4B	E8	8E	C2	C5F0:D0	EE	A5	FD	C9	00	D0		
C128:8D	10	D0	AD	00	D0	C9	58	9A	C390:FA	4B	E8	8E	FB	4B	E8	8E	DB	C5F8:A9	00	85	FD	A9	70	85		
C130:F0	08	A2	02	CA	D0	FD	4C	84	C398:F8	4F	E8	8E	F9	4F	E8	8E	E3	C600:A0	00	B1	FD	29	CC	91		
C138:A8	C0	A9	01	85	FB	60	A9	0C	C3A0:FA	4F	E8	8E	FB	4F	E8	8E	FC	C608:E6	FD	D0	02	E6	FE	A5		
C140:00	85	FB	A9	58	8D	00	D0	09	C3A8:F8	53	E8	8E	F9	53	E8	8E	05	C610:C9	78	D0	EE	A5	FD	C9		
C148:8D	08	D0	A9	88	8D	02	D0	98	C3B0:FA	53	E8	8E	FB	53	E8	8E	1E	C618:D0	E8	60	8A	48	A2	40		
C150:8D	0A	D0	A9	88	8D	04	D0	A6	C3B8:F8	57	E8	8E	F9	57	E8	8E	26	C620:A5	FD	6D	FC	C9	85	FD		
C158:8D	0C	D0	A9	E8	8D	06	D0	B4	C3C0:FA	57	E8	8E	FB	57	E8	8E	3F	C628:FE	6D	FD	C9	85	FE	CA		
C160:8D	0E	D0	A9	00	8D	10	D0	0A	C3C8:F8	5B	E8	8E	F9	5B	E8	8E	47	C630:EE	68	AA	60	20	66	C4		
C168:20	71	CB	EA	EA	A9	FF	8D	0C	C3D0:FA	5B	E8	8E	FB	5B	E8	8E	60	C638:75	C0	20	66	C4	4C	3F		
C170:15	D0	AD	11	D0	10	FB	CE	07	C3D8:F8	5F	E8	8E	F9	5F	E8	8E	68	C640:A2	80	A0	80	20	67	C3		
C178:00	D0	CE	02	D0	CE	04	D0	C4	C3E0:FA	5F	E8	8E	FB	5F	8C	FC	37	C648:F1	B7	86	FC	20	F1	B7		
C180:CE	06	D0	EE	08	D0	EE	0A	61	C3E8:43	C8	8C	FD	43	C8	8C	FE	0B	C650:FC	C0	00	D0	15	A9	09		
C188:D0	EE	0C	D0	EE	0E	D0	AE	BE	C3F0:43	C8	8C	FF	43	C8	8C	FC	31	C658:63	C2	A9	58	8D	53	C2		
C190:00	D0	E0	FF	D0	08	AD	10	76	C3F8:47	C8	8C	FD	47	C8	8C	FE	3D	C660:60	8D	31	C2	20	09	C2		
C198:D0	09	01	8D	10	D0	E0	CF	15	C400:47	C8	8C	FF	47	C8	8C	FC	64	C668:AE	C6	C0	01	D0	15	A9		
C1A0:D0	08	AD	10	D0	09	02	8D	81	C408:4B	C8	8C	FD	4B	C8	8C	FE	70	C670:8D	63	C2	A9	58	8D	53		
C1A8:10	D0	E0	9F	D0	08	AD	10	90	C410:4B	C8	8C	FF	4B	C8	8C	FC	96	C678:A9	60	8D	31	C2	20	09		
C1B0:D0	09	04	8D	10	D0	E0	6F	2D	C418:4F	C8	8C	FD	4F	C8	8C	FE	A2	C680:4C	AE	C6	C0	02	D0	15		
C1B8:D0	08	AD	10	D0	09	08	8D	A5	C420:4F	C8	8C	FF	4F	C8	8C	FC	C8	C688:06	8D	63	C2	A9	50	8D		
C1C0:10	D0	AE	08	D0	E0	6F	D0	90	C428:53	C8	8C	FD	53	C8	8C	FE	D4	C690:C2	A9	68	8D	31	C2	20		
C1C8:08	AD	10	D0	09	80	8D	10	4D	C430:53	C8	8C	FF	53	C8	8C	FC	FA	C698:C2	4C	AE	C6	A9	15	8D		
C1D0:D0	E0	9F	D0	08	AD	10	D0	DD	C438:57	C8	8C	FD	57	C8	8C	FE	07	C6A0:C2	A9	50	8D	53	C2	A9		
C1D8:09	40	8D	10	D0	E0	CF	D0	1E	C440:57	C8	8C	FF	57	C8	8C	FE	2D	C6A8:8D	31	C2	20	09	C2	E0		
C1E0:08	AD	10	D0	09	20	8D	10	D6	C448:5B	C8	8C	FD	5B	C8	8C	FE	39	C6B0:F0	0A	A2	A0	A0	C0	20		
C1E8:00	E0	FF	D0	08	AD	10	D0	02	C450:5B	C8	8C	FF	5B	C8	8C	FC	5F	C6B8:C3	4C	3F	C1	AD	12	D0		
C1F0:09	10	8D	10	D0	AD	00	D0	B2	C458:5F	C8	8C	FD	5F	C8	8C	FE	6B	C6C0:32	D0	F9	A9	58	8D	00		
C1F8:C9	58	F0	08	A2	02	CA	D0	99	C460:5F	C8	8C	FF	5F	60	A2	A0	BF	C6C8:8D	08	D0	A9	88	8D	02		
C200:FD	4C	72	C1	A9	01	85	FB	5A	C468:A0	C0	20	67	C3	A2	08	A0	46	C6D0:8D	0A	D0	A9	B8	8D	04		
C208:60	A9	00	85	FB	AD	11	D0	0A	C470:FF	A9	00	85	5A	A9	67	85	8A	C6D8:8D	0C	D0	A9	E8	8D	06		
C210:10	FB	EE	00	D0	EE	02	D0	91	C478:5B	A9	00	85	58	A9	6F	85	40	C6E0:8D	0E	D0	60	AD	11	D0		
C218:EE	04	D0	EE	06	D0	EE	08	78	C480:59	20	EC	A3	A2	08	A0	FF	0D	C6E8:FB	AD	1B	D0	49	FF	8D		
C220:D0	EE	0A	D0	EE	0C	D0	EE	50	C488:A9	00	85	5A	A9	67	85	5B	8E	C6F0:D0	60	AD	12	D0	C9	26		
C228:0E	D0	20	62	C2	AD	00	D0	B0	C490:A9	00	85	58	A9	77	85	59	B4	C6F8:F9	AD	11	D0	49	10	8D		
C230:C9	68	D0	DE	CE	00	D0	CE	A3	C498:20	EC	A3	20	F1	B7	E0	00	14	C700:D0	60	20	F1	B7	8E	22		
C238:02	D0	CE	04	D0	CE	06	D0	AB	C4A0:F0	03	4C	D6	C5	A9	A0	8D	FD	C708:20	F1	B7	8E	23	D0	F1		
C240:CE	08	D0	CE	0A	D0	CE	0C	73	C4A8:FB	C9	A2	00	C0	A0	A9	03	52	C710:B7	8E	24	D0	A9	FF	A2		
C248:D0	CE	0E	D0	20	62	C2	AD	76	C4B0:85	FD	A9	40	85	FE	AD	FB	35	C718:9D	FF	77	CA	D0	FA	A9		
C250:00	D0	C9	50	D0	DE	AD	01	A6	C4B8:C9	8D	FC	C9	A9	00	8D	FD	2D	C720:8D	11	D0	60	A9	1B	8D		
C258:DC	C9	EF	D0	B5	A9	01	85	A5	C4C0:C9	20	1B	C6	A9	00	91	FD	75	C728:D0	60	AD	12	D0	C9	26		
C260:FB	60	A0	06	88	EA	D0	FC	FE	C4C8:C8	91	FD	C8	91	FD	C8	C8	46	C730:F9	78	A9	00	8D	15	D0		
C268:60	AD	12	D0	C9	FA	D0	F9	AE	C4D0:C8	C8	C0	3C	D0	F0	EE	FB	F0	C738:15	8D	18	D0	A9	97	8D		
C270:A9	00	8D	15	D0	8D	17	D0	89	C4D8:C8	E8	E0	04	D0	CE	EE	FB	79	C740:DD	A9	04	8D	88	02	A9		
C278:A9	FF	8D	10	D0	8D	1B	D0	49	C4E0:C9	EE	FB	C9	EE	FB	C9	EE	11	C748:8D	14	03	A9	EA	8D	15		
C280:8D	1D	D0	EA	A2	2F	8E	1C	2B	C4E8:FB	C9	AD	FB	C9	B9	90	D1		C750:A9	F0	8D	1A	D0	A9	81		
C288:D0	20	F1	B7	8E	25	D0	20	03	C4F0:B9	A9	A4	8D	FB	C9	A2	00	7B	C758:0D	DC	A9	1B	8D	11	D0		
C290:F1	B7	8E	26	D0	20	F1	B7	D3	C4F8:A0	00	A9	00	85	FD	A9	40	BF	C760:CA	8D	26	03	A9	F1	8D		
C298:8A	A2	08	9D	26	D0	CA	D0	C1	C500:85	FE	AD	FB	C9	8D	FC	C9	CB	C768:03	A9	83	8D	02	03	A9		
C2A0:FA	A9	32	A2	10	9D	FF	CF	45	C508:A9	00	8D	FD	C9	20	1B	C6	C5	C770:8D	03	03	A9	47	8D	18		
C2A8:CA	CA	D0	F9	A9	01	85	FB	58	C510:A9	00	91	FD	C8	91	FD	C8	D3	C778:A9	FE	8D	19	03	58	60		
C2B0:A9	00	8D	0E	DC	A9	33	85	17	C518:91	FD	C8	C8	C8	C0	42	BE		C780:40	8D	88	02	A9	93	20		
C2B8:01	A2	08	A0	FF	A9	00	85	9E	C520:D0	F0	EE	FB	C9	E8	E0	04	A5	C788:FF	A9	88	AD	26	03	A9		
C2C0:5A	A9	D7	85	5B	A9	00	85	38	C528:D0	CE	EE	FB	C9	EE	FB	C9	39	C790:8D	27	03	A9	9E	8D	18		
C2C8:58	A9	7F	85	59	20	EC	A3	F5	C530:EE	FB	C9	EE	FB	C9	AD	FB	B8	C798:A9	C8	8D	19	03	A9	AE		
C2D0:A9	37	85	01	A9	01	8D	0E	34	C538:C9	C9	BD	90	B9	A9	C0	8D	5F	C7A0:02	03	A9	C8	8D	03	03		
C2D8:DC	A9	00	85	FD	A9	40	85	2C	C540:FB	C9	A2	00	A0	00	A9	00	E8	C7A8:69	C2	EA	08	8D	FE	C9		
C2E0:FE	A0	00	A9	20	91	FD	E6	D2	C548:85	FD	A9	40	85	FE	AD	FB	CE	C7B0:48	98	48	A5	D1	8D	FF		
C2E8:FD	D0	02	E6	FE	A6	FE	E0	C1	C550:C9	8D	FC	C9	A9	00	8D	FD	C6	C7B8:A5	D2	8D	00	CA	A5	D3		
C2F0:60	D0	F2	A6	FD	E0	00	D0	E7	C558:C9	20	1B	C6	A9	00	91	FD	0F	C7C0:01	CA	A5	D5	8D	02	CA		
C2F8:EC	AD	12	D0	C9	FA	D0	F9																			



PROGRAMS

CA78:E0	04	D0	E3	60	A9	60	A2	E4
CA80:00	9D	F8	43	9D	F8	47	9D	CD
CA88:F8	4B	9D	F8	4F	9D	F8	53	E6
CA90:9D	F8	57	9D	F8	5B	9D	F8	61
CA98:5F	E8	E0	04	D0	E3	60	A2	ED
CAA0:A0	A0	C0	20	67	C3	60	A9	7D
CAA8:00	8D	20	D0	8D	21	D0	20	65
CAB0:F2	C6	A9	1C	8D	5C	C8	A9	81
CAB8:60	8D	96	C8	20	46	C8	A9	96
CAC0:20	8D	5C	C8	A9	A9	8D	96	87
CAC8:C8	A9	FE	8D	E0	78	A9	FD	20
CAD0:8D	E1	78	A9	FB	8D	E2	78	A3
CAD8:A9	F7	8D	E3	78	A9	EF	8D	09
CAE0:E4	78	A9	DF	8D	E5	78	A9	D8
CAE8:BF	8D	E6	78	A9	F7	8D	E7	74
CAF0:78	A9	00	85	FD	A9	D8	85	53
CAF8:FE	A0	00	A9	E0	91	FD	E6	FA
CB00:FD	D0	02	E6	FE	A6	FE	E0	E9
CB08:DB	D0	F2	A6	FD	E0	E8	D0	A0
CB10:EC	20	F2	C6	A9	0B	20	5C	07
CB18:CB	A9	0C	20	5C	CB	A9	0F	F7
CB20:20	5C	CB	A9	01	20	5C	CB	FF
CB28:A9	03	20	5C	CB	A9	0E	20	60
CB30:5C	CB	A9	06	20	5C	CB	60	E8
CB38:A9	0E	20	5C	CB	A9	03	20	1D
CB40:5C	CB	A9	01	20	5C	CB	A9	F1
CB48:0F	20	5C	CB	A9	0C	20	5C	D1
CB50:CB	A9	0B	20	5C	CB	A9	00	01
CB58:20	5C	CB	60	A6	12	D0	E0	D6
CB60:FF	D0	F9	8D	21	D0	A0	E3	1D
CB68:A2	32	CA	D0	FD	88	D0	F8	F0
CB70:60	AD	12	D0	C9	3C	D0	F9	CD
CB78:60	00	00	00	00	00	00	00	40

```

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    TD - ALL RIGHTS RESERVED
QM 20 POKE53280,0:POKE53265,11
    :PRINT"[CLR]{9 DOWN}":PO
    KE53281,0:FORDL=1TO200:N
    EXT
FP 30 POKE53265,27:M$="ONE MOM
    ENT PLEASE. . ."
EK 40 C$="{BLK}{4}{5}{8}{WHT}
    ":FORT=1TO5:PRINTTAB(10)M
    ID$(C$,T,1)M$"[UP]":FORD
    L=1TO20:NEXT:NEXT
EC 50 POKE147,0:SYS57812"SIMUL
    FORT.OBJ",8,1:SYS62631
CA 60 FORT=200*64TO201*64+63:R
    EADX:POKET,X:NEXT
BH 70 SS=0:CC=0:X=61440
QR 80 S=200*64:E=200*64+63:N=X
    :GOSUB720
PE 90 N=X-2048:GOSUB720:N=X-40
    96:GOSUB720:N=X-14336:GO
    SUB720
BP 100 X=X+128:CC=CC+1
DC 110 IFCC=2ANDSS=0THENCC=0:S
    S=1:X=X+64
GG 120 IFCC=2ANDSS=1THENCC=0:S
    S=0:X=X-64
PJ 130 IFX<63488THEN80
DC 140 SS=1:CC=0:X=61440+64
GE 150 S=201*64:E=201*64+63:N=
    X:GOSUB720
EH 160 N=X-2048:GOSUB720:N=X-4
    096:GOSUB720:N=X-14336:
    GOSUB720
RQ 170 X=X+128:CC=CC+1
HH 180 IFCC=2ANDSS=0THENCC=0:S
    S=1:X=X+64
PJ 190 IFCC=2ANDSS=1THENCC=0:S

```

AUGUST 1991 COMPUTE G-29



PROGRAMS

```

{9 SHIFT-SPACE}{RVS}
{SHIFT-SPACE}{3 SPACES}
{SHIFT-SPACE}{OFF}
{9 SHIFT-SPACE}";:NEXT
QJ 560 PRINT "{17 RIGHT}{RVS}
{10 SHIFT-SPACE}
{3 SPACES}
{10 SHIFT-SPACE}";
GH 570 FORT=1TO3:PRINT"
{17 RIGHT}{RVS}
{23 SPACES}";:NEXT
EF 580 PRINT "{17 RIGHT}{RVS}
{10 SHIFT-SPACE}
{3 SPACES}
{10 SHIFT-SPACE}";
QC 590 FORT=1TO3:PRINT"
{17 RIGHT}{OFF}
{9 SHIFT-SPACE}{RVS}
{SHIFT-SPACE}{3 SPACES}
{SHIFT-SPACE}{OFF}
{9 SHIFT-SPACE}";:NEXT
SJ 600 PRINT:PRINT:PRINT
PK 610 FORT=1TO3:PRINT "{BLU}@@
@@@@@{7}{@{YEL}@@@{7}{@
{BLU}@@@@@":NEXT
BJ 620 PRINT "{7}{@@@@@
{YEL}@@@{7}{@{@@@@@
@"
FG 630 FORT=1TO3:PRINT "{YEL}@@
@@@@@@@@@@@@@@@@@@@@":
NEXT
HJ 640 PRINT "{7}{@@@@@
{YEL}@@@{7}{@@@@@
HP 650 FORT=1TO2:PRINT "{BLU}@@
@@@@@{7}{@{YEL}@@@{7}{@
{BLU}@@@@@":NEXT
SB 660 PRINT "{BLU}@@@@@{7}{@
{YEL}@@@{7}{@{BLU}@@@@@
@@@@@{HOME}":SYS50930
BC 670 SYS51388,0,6
KM 680 SYS50916:SYS51725,0:SYS
50746,0:SYS50916:SYS517
25,1:SYS50746,0
FX 690 SYS50916:SYS50740,0:SYS
50752,2,1

```

```

HF 700 SYS51388,0,6:SYS50916:S
YS50740,0:FORDL=1TO100:
NEXT:SYS50746,0
FB 710 SYS50916:GOTO330
GM 720 L=E-S:EN=L+N
AJ 730 A=L/256:A=L-256*A%:B%=
(EN-A)/256:B=EN-256*B%-
A:C%=(E-A)/256:C=E-256*
C%-A
JK 740 POKE781,A%+1:POKE782,A:
POKE90,C:POKE91,C%:POKE
88,B:POKE89,B%:SYS41964
KE 750 RETURN
FS 760 DATA170,170,170,149,85,
87,149,85
FP 770 DATA87,154,90,87,154,21
8,215,154
KS 780 DATA218,215,154,218,215
,154,218,215
ME 790 DATA154,170,215,154,170
,215,154,170
DE 800 DATA215,154,170,215,154
,250,215,154
MB 810 DATA218,215,154,218,215
,154,218,215
JH 820 DATA154,218,215,151,215
,215,149,85
BJ 830 DATA87,149,85,87,191,25
5,255,42
XQ 840 DATA170,170,170,149,85,
87,154,170
BK 850 DATA87,154,170,215,154,
170,215,154
FG 860 DATA170,215,154,255,215
,154,213,87
KG 870 DATA154,169,087,154,171
,87,154,171
HQ 880 DATA87,154,171,87,154,2
55,87,154
KD 890 DATA213,87,154,170,87,1
54,170,215
RX 900 DATA154,170,215,154,170
,215,151,255
JF 910 DATA215,149,85,87,191,2
55,255,42

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IMPORT

```

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QJ 10 POKE53280,0:POKE53281,0:
PRINT "{CLR}{WHT}"TAB(7)"
SIMULVIDEO BITMAP GRABBE
R{2 DOWN}"
XG 20 DIMSC(11):PRINT"ENTER MU
LTICOLOR BITMAP":INPUT"F
ILENAME";M$:M$=M$+"P,R"
SR 30 PRINT "{DOWN}ENTER FILENA
ME TO SAVE SIMULVIDEO":I
NPUT"GRAPHICS UNDER";C$
EJ 40 PRINT "{2 DOWN}LOADING...
"
KP 50 OPEN1,8,1,M$:POKE185,0:P
OKE780,0:POKE781,0:POKE7
82,64:SYS65493:CLOSE1
BM 60 PRINT "{DOWN}CONVERTING..
.TAKES 2 MIN 26 SEC..."
QB 70 S=24576:M=16384:A=21:B=2
56:C=2:D=8:E=3:F=64:G=24
8:H=40:I=7:J=504
CG 80 Z=0:FORT=0TO11:SC(T)=Z:Z
=Z+1:IFZ>2THENZ=0
AQ 90 NEXT:FORV=0TO167:FORX=0T
O47STEP4
XX 100 M%=S+(INT(Y/A)*B)+(INT(
X*C/D/E)*F)+(E*(INT(Y)-
(INT(Y/A))*A))+SC(INT(X
*C/D))
HJ 110 POKEM%,PEEK(M+(YANDG)*H
+(YANDI)+(C*XANDJ)):NEX
T:NEXT
SE 120 PRINT "{2 DOWN}SAVING...
":SYS57812C$,8,1:POKE19
3,0:POKE194,96
QE 130 POKE174,0:POKE175,104:S
YS62957

```

O R R I C K H A M P T O N J R .

Teachers, get out your favorite riddle book and use it with this program to spice up your homework assignments or quizzes. *Riddle* prints a quiz that reveals the answer to your riddle when students correctly answer the assigned questions.

Following your list of questions are two columns of possible answers, with a letter printed in front of each answer. When students cross off the letters corresponding to the correct answers, the remaining letters, reading from left to right and top to bottom, spell out the answer to your riddle.

Typing It In

Riddle is written entirely in BASIC. To avoid typing errors, use *The Automatic Proofreader* to enter the program; see "Typing Aids" elsewhere in

RIDDLE

TEACHERS CAN SPICE
UP QUIZZES WITH
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GENERATOR FOR
THE 64

this section. When you have finished typing, be sure that you save a copy of the program before you exit the *Automatic Proofreader*.

Ask Me a Riddle

When you run the program, you'll be presented with a menu with the following choices.

- 1 GET FROM DISK
- 2 CREATE NEW RIDDLE
- 3 CORRECT
- 4 SAVE TO DISK
- 5 PRINT
- 6 PRINT ANSWERS
- 7 DISK DIRECTORY
- 8 CLEAR MEMORY
- 9 QUIT

Choice 1 enables you to retrieve any work sheet you have previously saved to disk. Just enter the filename and hit Return. If you select this option or any option by mistake, just press the back-arrow key to return to



PROGRAMS

the main menu.

Choice 2 enables you to create a new riddle work sheet. Your first task will be to enter a riddle. The only limitation on the question is that it contain 254 characters or less.

Next, enter the answer to your riddle in lowercase characters, leaving no spaces between words. The answer must contain no more than 254 characters. You may want to keep your answer relatively short, as its length is related to the number of distractor answers you'll have to provide. More about that later.

At this point you may enter any instructions you want printed on the sheet. Again you are restricted to 254 characters.

Now enter the number of questions or problems you want to include and then the questions or problems themselves. Here you are restricted to 70 characters per question. If you are using *Riddle* as an answer sheet, you can enter page numbers and/or problem numbers at this point. After each question or problem enter the correct answer. As with the questions, you are restricted to 70 characters.

Next, enter one distractor answer for every character in your riddle's answer. Distractors are incorrect answers from among which the students must select the correct ones. Think of them as the wrong answers on a multiple choice quiz. Just be sure that none of the distractor answers are the same as any of the correct answers. The computer will check for an exact string match, but it will not catch duplicate answers like 2.5 and 2.50, 1/2 and 4/8, or alternate spellings of the same word. You are restricted to 70 characters here. This may sound confusing, but it will become clear after you prepare your first sheet.

If at any point in this process you want to go back and change something or make corrections, just keep pressing the back arrow until you return to the desired spot. Then reenter the correct information. When finished, keep pressing Return until you get back to where you were. The input routine in this program has been changed to allow you to enter commas; however, you can't insert or type over characters. You can only use the Delete key to erase characters.

Choice 3 enables you to correct any mistakes you discover after you

return to the main menu. This option takes you back through the create-new-riddle sequence, displaying what you have previously entered. Just keep pressing Return until you reach the place where you want to change any information. Then keep pressing Return until you get back to the main menu.

Choice 4 enables you to save your work sheet to disk. Just enter the filename.

Choice 5 prints your work sheet. It will ask you to press Return when the printer is ready. Then enter the number of copies you want and press Return again. The printing routine is not printer specific. It formats the page by assuming 80 characters per line and 66 lines per page. If you change the definition of keys to print special characters, be sure that they are the same width as normal characters.

Choice 6 prints a duplicate of the problem sheet, but with the correct answers on it. In front of each correct answer, the program will print the corresponding question number and a letter which is part of the riddle answer. Distractor answers will have only a letter in front of them.

You may want to have the students write the problem number before every answer they cross out to be sure they actually worked the problems. Their answers could differ from those on this answer sheet if more than one problem had the same correct answer.

Choice 7 is disk directory. It gives you a two-column listing of the directory.

Choice 8 clears the computer's memory. If you create a new riddle without first clearing the memory of the old information, the previous riddle will still be there. There are times you might want to do this.

Choice 9 lets you quit. Use this option to exit the program.

You don't have to remember all the restrictions on entering your data; *Riddle* is a fairly user-friendly program, and the computer will inform you if you make a mistake. The one restriction you will have to remember, though, is to make sure that none of your distractors are equivalent to a right answer. The computer will only check for identical answers. An identical distractor could slip through.

RIDDLE

```

BE 1 REM COPYRIGHT 1991 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
SR 10 DIMA$(99),G$(99),Q(99),C
    (99),N(99),O(99),D$(99),
    DS(99),QS(99)
MM 20 GOSUB 1940:GOSUB2560
DM 30 PA$="":ZRS$="":PRINT"
    {CLR}"CHR$(158);:POKE532
    72,23:PRINTCHR$(8)
CS 40 GOSUB1960
HB 50 GETP$:IFP$=""THEN50
AQ 60 H=VAL(P$):IF H<1 OR H>9
    {SPACE}THEN 50
QM 70 ON H GOTO 1420,110,110,1
    250,700,2160,2170,1540,1
    830
QF 80 GOTO20
SB 90 GOTO2130
JB 100 IF P$="Y"THEN30
KC 110 GOSUB1560:IFRQ$<>""THEN
    PRINT"CURRENT
    {SHIFT-SPACE}QUESTION":
    PRINT"{RVS}"RQ$"{OFF}"
XH 120 PRINT"ENTER
    {SHIFT-SPACE}RIDDLE
    {SHIFT-SPACE}ANSWER":
    GOSUB1650
SK 130 IFIP$<>""ANDP$<>""THEN
    RQ$=IP$
QJ 140 IF P$="<"THEN30
SD 150 IF RQ$="<"THEN110
EG 160 GOSUB1560:PRINT"CURRENT
    {SHIFT-SPACE}QUESTION":
    PRINT"{RVS}"RQ$"{OFF}":
    PRINT
MD 170 IF RA$<>""THENPRINT"CUR
    RENT{SHIFT-SPACE}ANSWER
    ":PRINT"{RVS}"RA$"{OFF}
    "
SD 180 PRINT"ENTER
    {SHIFT-SPACE}RIDDLE
    {SHIFT-SPACE}ANSWER":GO
    SUB1650
PQ 190 IF IP$<>"" AND P$<>""<
    {SPACE}THEN RA$=IP$:LR=
    LEN(RA$)
GA 200 IF P$="<" THEN 110
JB 210 IF RA$="" THEN 160
HR 220 FORI=1TOLR:IFASC(MID$(R
    A$,I,1))=32THENPRINT"NO
    {SHIFT-SPACE}SPACES"
SF 230 IFASC(MID$(RA$,I,1))=32
    THENPRINT:GOTO180
KF 240 A=ASC(MID$(RA$,I,1))
CA 250 IFA>90 OR A<64 THENPRIN
    T"LOWERCASE
    {SHIFT-SPACE}LETTERS
    {SHIFT-SPACE}ONLY":PRIN
    T:GOTO180
QG 260 NEXTI
SE 270 GOSUB1560:IFI$<>""THENP
    RINT"CURRENT
    {SHIFT-SPACE}INSTRUCTIO
    NS":PRINT"{RVS}"I$
    {OFF}":PRINT
CF 280 PRINT"ENTER
    {SHIFT-SPACE}INSTRUCTIO
    NS":GOSUB1650
FF 290 IFIP$<>"" AND P$<>""<
    HEN I$=IP$
  
```




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AQ 300 IF P$="<" THEN 160
JG 310 IF I$="" THEN 270
ER 320 LR = LEN(RA$)
DC 330 GOSUB1560:PRINTLR;" DIS
TRACTORS":PRINT
HK 340 IF N<>0 THEN PRINT"CURR
ENT{SHIFT-SPACE}NUMBER
{SHIFT-SPACE}OF
{SHIFT-SPACE}PROBLEMS":
PRINT{RVS}"N{"OFF}":PR
INT
QB 350 PRINT"ENTER
{SHIFT-SPACE}NUMBER
{SHIFT-SPACE}OF
{SHIFT-SPACE}PROBLEMS "
:GOSUB1650
XF 360 IF IP$<>"ANDP$<>"<"THE
NN=VAL(IP$)
EH 370 IF P$="<" THEN 270
MR 380 IF N = 0 THEN 330
AD 390 I=1
DH 400 GOSUB1560:PRINTN;" QUES
TIONS":PRINT
FQ 410 IF Q$(I)<>" THENPRINT"C
URRENT{SHIFT-SPACE}QUES
TION":PRINT{RVS}"Q$(I
)"{"OFF}":PRINT
AX 420 PRINT"ENTER
{SHIFT-SPACE}QUESTION "
:I:GOSUB1650
RP 430 IFIP$<>"ANDP$<>"<"THEN
Q$(I)=IP$
PC 440 IF LEN(Q$(I))>70 THENPR
INT"NO{SHIFT-SPACE}MORE
{SHIFT-SPACE}THAN 70
{SHIFT-SPACE}CHARACTERS
"
CQ 450 IF LEN(Q$(I))>70 THENPR
INT:GOTO420
CH 460 IF P$="<" THEN IF I=1 TH
EN 330
XG 470 IF P$="<" THEN IF I>1 TH
EN I=I-1:GOTO400
DE 480 IF A$(I)<>" THENPRINT"C
URRENT{SHIFT-SPACE}RIGH
T{SHIFT-SPACE}ANSWER":P
RINT{RVS}"A$(I)"{"OFF}":
JS 490 PRINT:PRINT"ENTER
{SHIFT-SPACE}RIGHT
{SHIFT-SPACE}ANSWER":GO
SUB1650
SC 500 IFIP$<>"ANDP$<>"<"THEN
A$(I)=IP$
DM 510 IF P$="<" THEN 400
SF 520 IF A$(I)=" THEN480
PG 530 IF LEN(A$(I))>70 THEN P
RINT:PRINT"NO
{SHIFT-SPACE}MORE
{SHIFT-SPACE}THAN 70 CH
ARACTERS"
FJ 540 IF LEN(A$(I))>70 THEN P
RINT:GOTO420
GG 550 I=I+1:IF I<N THEN 400
MR 560 I=1
RB 570 GOSUB1560:PRINTLEN(RA$)
;" DISTRACTORS":PRINT
EM 580 IFD$(I)<>" THENPRINT"CU
RRENT{SHIFT-SPACE}DISTR
ACTOR":I:PRINT{RVS}"D$(
I)"{"OFF}":PRINT
EA 590 PRINT"ENTER DISTRACTOR"
:I:GOSUB1650
HS 600 IFIP$<>"ANDP$<>"<"THEN
D$(I)=IP$

```

```

GG 610 IF LEN(D$(I))>70 THEN P
RINT"NO{SHIFT-SPACE}MOR
E{SHIFT-SPACE}THAN
{SHIFT-SPACE}70
{SHIFT-SPACE}CHARACTERS
":PRINT:GOTO590
PC 620 IF P$="<" THEN I=I-1:IF
I>0 THEN GOTO570
BH 630 IFI<=0 THEN I=N:GOTO400
QQ 640 IF D$(I)=" THEN570
XJ 650 FORJ=1TON:A=VAL(A$(J)):
IFD$(I)=A$(J) THEN670
BE 660 NEXTJ:GOTO680
CM 670 PRINT"DUPLICATES AN
{SHIFT-SPACE}ANSWER":PR
INT:GOTO590
ER 680 I=I+1:IFI<=LEN(RA$) THE
N 570
HX 690 GOTO30
CS 700 GOSUB1580:INPUT"HIT
{SHIFT-SPACE}RETURN
{SHIFT-SPACE}WHEN
{SHIFT-SPACE}PRINTER
{SHIFT-SPACE}IS
{SHIFT-SPACE}READY":ZR$
IFZR$="<"ORRA$=" THEN30
PE 710 GOSUB 1580
JE 720 INPUT"NUMBER
{SHIFT-SPACE}OF
{SHIFT-SPACE}COPIES";N$
:NC=VAL(N$):IFN$="" OR
{SPACE}N$="<" THEN 30
RB 730 OPEN1,4,7:FORPG=1TONC
PQ 740 FORRS=139TO143:POKERS,A
SC(RA$):NEXTRS:GOSUB139
0
EP 750 X=0:FORI=1TON:IFX<LEN(Q
$(I)) THENX=LEN(Q$(I))
RG 760 NEXTI
RC 770 IT=X+9:CN=INT(80/IT):QC
=CN
KJ 780 LQ=0:ZS=1:ZE=76:LL=LEN(
RQ$):IFZE>=LLTHENZE=LL:
GOTO820
XK 790 IFMID$(RQ$,ZE,1)<>" "AN
DZE<>1THENZE=ZE-1:GOTO7
90
PX 800 PRINT#1,MID$(RQ$,ZS,ZE-
ZS+1):ZS=ZE+1:ZE=ZE+76:
LQ=LQ+1
DJ 805 IFZE>=LLTHENZE=LL:GOTO
{SPACE}820
FM 810 GOTO790
GR 820 N5=12+LQ+LI
SD 830 PRINT#1,RIGHT$(RQ$,LL-Z
S+1):PRINT#1:LQ=LQ+1
KC 840 ZS=1:ZE=76:LI=0:LL=LEN(
I$):IFZE>=LLTHENZE=11:G
OTO880
EX 850 IFMID$(I$,ZE,1)<>" "AND
ZE<>1THENZE=ZE-1:GOTO85
0
MJ 860 PRINT#1,MID$(I$,ZS,ZE-Z
S+1):ZS=ZE+1:ZE=ZE+76
DH 865 IFZE>=LLTHENZE=LL:LI=LI
+1:GOTO880
BX 870 GOTO850
AR 880 PRINT#1,RIGHT$(I$,LL-ZS
+1):LI=LI+1
CF 890 T=CN:PRINT#1:PRINT#1:FO
RI=1TON
PB 900 PRINT#1,STR$(I);". ";Q$
(I);SPC(IT-LEN(Q$(I)))-L
EN(STR$(I))-2);

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```

GF 910 T=T-1:IFT<=0THENT=CN:PR
INT#1:PRINT#1:N5=N5+2:G
OSUB2130
GS 920 NEXTI:PRINT#1
QE 930 FORI=1TON
JC 940 J=INT(1+N*RD(1)):IFC(J
)=1THEN940
CP 950 C(J)=1:O(I)=J:NEXTI:FOR
I=1TON:C(I)=0:NEXTI
RC 960 X=0:FORI=1TON:IFX<LEN(A
$(I)) THENX=LEN(A$(I))
JD 970 NEXTI
SC 980 ND=LEN(RA$):FORI=1TOND
KH 990 FORI=1TOND:IFX<LEN(D$(I
)) THENX=LEN(D$(I))
SK 1000 :NEXTI:IT=X+6:CN=INT(8
0/IT):FORI=1TOND
PQ 1010 J=INT(1+ND*RD(1)):IFC
(J)=1THEN1010
QB 1020 DS(I)=J:C(J)=1:NEXTI:F
ORI=1TOND:C(I)=0:NEXTI
GG 1030 FORI=1TOLEN(RA$):IFX<L
EN(D$(I)) THENX=LEN(D$(
I)):NEXTI
CJ 1040 IFPA$="A" THENPRINT#1:P
RINT#1,RA$:PRINT#1:I=1
:J=1:T=CN
RJ 1050 IFPA$<>"A" THENPRINT#1:
PRINT#1:PRINT#1:I=1:J=
1:T=CN
PK 1060 FQ=LEN(RA$)/(N+LEN(RA$
))
HM 1070 K=RND(1)
BC 1080 IFK>FQ THENM=INT(1+26*
RND(1))
KS 1090 LO=LEN(STR$(O(I)))-3:R
O=LO+2:Z=O(I):Z$=RIGHT
$(STR$(Z),RO)
HR 1095 IFPA$<>"A" THEN1130
CQ 1100 IFK>FQ ANDI<=N AND PA$
="A" THENPRINT#1,Z$;CH
R$(64+M);"=";A$(Z);
SE 1110 IFK>FQ ANDI<=N THENPRI
NT#1,SPC(IT-(LEN(CHR$(
64+M))+3+LEN(A$(O(I))))
)-LO);
KH 1120 IFK>FQ ANDI<=N AND PA$
="A" THEN GOTO 1150
BS 1130 IFK>FQ ANDI<=N THENPRI
NT#1,CHR$(64+M);" = ";
A$(O(I));
JR 1140 IFK>FQ ANDI<=N THENPRI
NT#1,SPC(IT-(LEN(CHR$(
64+M))+3+LEN(A$(O(I))))
));
QH 1150 IFK>FQ ANDI<=N THENI=I
+1:T=T-1
QA 1160 IFT<=0THENT=CN:PRINT#1
:PRINT#1:N5=N5+2:GOSUB
2130
EJ 1170 IF K>FQ THEN1220
KF 1180 IFJ<=LEN(RA$) THENPRINT
#1,MID$(RA$,J,1);" = "
;D$(DS(J));
PG 1190 IFJ<=LEN(RA$) THENPRINT
#1,SPC(IT-4-LEN(D$(DS(
J)))));
JM 1200 C=0
EJ 1210 IFJ>LEN(RA$) THEN1220
CJ 1215 J=J+1:T=T-1:IFT<=0 THE
NT=CN:PRINT#1:PRINT#1:
N5=N5+2:GOSUB90
BC 1220 IFI>N AND J>LEN(RA$) TH
EN GOSUB1600

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RF 1230 IF I>N AND J>LEN(RA$)TH
EN NEXTPG:CLOSE1:GOTO3
0
HB 1240 GOTO1070
XK 1250 GOSUB1580:N$="":INPUT"
FILENAME";N$:IFN$="<"
{SPACE}OR N$=" " OR RA$
=" " THEN 30
JG 1260 N$=N$+",S,W":OPEN5,8,5
,N$:ND=LEN(RA$)
JG 1270 OPEN15,8,15:INPUT#15,E
,E$,C,D
DH 1280 IF E<>63 THEN GOTO1310
DE 1290 PRINT$;"OK TO OVERWR
ITE (Y/N)";:INPUTYN$
FB 1300 IF LEFT$(YN$,1)<>"Y" T
HEN CLOSE5:CLOSE15:GOT
O30
EQ 1310 CLOSE5:PRINT#15,"S0:"+
N$:CLOSE15:OPEN5,8,5,N
$
RC 1320 PRINT#5,RQ$:PRINT#5,RA
$:PRINT#5,N:FORI=1TON:
PRINT#5,Q$(I):NEXTI
FQ 1330 FORI=1TON:PRINT#5,A$(I
):NEXTI
FE 1340 FORI=1TOND:PRINT#5,D$(
I):NEXTI:PRINT#5,I$:PR
INTCHR$(147);
FE 1350 CLOSE5:I=N+1:J=LEN(RA$
)+1:C=0:GOTO30
AS 1360 IFC=3 THENRUN
BQ 1370 IFC=4 THENCLOSE1:PRINT
CHR$(147);:END
RJ 1380 GOTO1070
GX 1390 PRINT#1,"CROSS OUT THE
LETTERS THAT GO WITH
{SPACE}THE RIGHT ANSWE
RS."
AG 1400 PRINT#1,"THE LETTERS L
EFT WILL SPELL THE ANS
WER TO THE FOLLOWING."
GS 1410 PRINT#1:PRINT#1:RETURN
GM 1420 GOSUB1580:N$="":INPUT"
FILENAME";N$:IFN$="<"O
RN$=" " THEN30
GE 1430 N$="0:"N$+",S,R":OPEN
5,8,5,N$
EB 1440 OPEN15,8,15:INPUT#15,E
,E$,C,D
HC 1450 IF E<>62 THEN GOTO1470
BX 1460 PRINT$;"HIT <RETURN>
";:INPUTYN$:CLOSE5:CLO
SE15:GOTO30
SK 1470 CLOSE5:CLOSE15:OPEN5,8
,5,N$
CE 1480 GOSUB2100:RQ$=ZZ$:GOSU
B2100:RA$=ZZ$:GOSUB210
0:N=VAL(ZZ$):FORI=1TON
MA 1490 GOSUB2100
CP 1500 Q$(I)=ZZ$:NEXTI
RQ 1510 FORI=1TON:GOSUB2100:A$(
I)=ZZ$:NEXTI:FORI=1TO
LEN(RA$):GOSUB2100:D$(
I)=ZZ$
QJ 1520 NEXTI
RE 1530 GOSUB2100:I$=ZZ$:CLOSE
5:GOTO30
JP 1540 RUN
BS 1550 QQ$="ENTER
{SHIFT-SPACE}NUMBER
{SHIFT-SPACE}OF
{SHIFT-SPACE}PROBLEMS"
:RETURN
BS 1560 PRINT"{CLR}{RVS}
{11 SPACES}HIT
{SHIFT-SPACE}<
{SHIFT-SPACE}TO
{SHIFT-SPACE}GO
{SHIFT-SPACE}BACK
{3 SPACES}
{10 SHIFT-SPACE}{OFF}"
MC 1570 RETURN
FS 1580 PRINT"{CLR}{RVS}
{10 SPACES}ENTER
{SHIFT-SPACE}<
{SHIFT-SPACE}TO
{SHIFT-SPACE}GO
{SHIFT-SPACE}BACK
{3 SPACES}
{9 SHIFT-SPACE}{OFF}"
AE 1590 RETURN
QG 1600 NL=12+LQ+LI+2*INT(N/QC
)
CM 1610 N2=NL
BQ 1620 NL=NL+2*(INT((LEN(RA$
)+N)/CN))
EK 1630 IFNL>63THENNL=NL-63:GO
TO1630
XF 1640 FORI=NLTO66:PRINT#1:NE
XTI:RETURN
ED 1650 IP$=""
BJ 1660 PRINT"{RVS} {OFF}
{LEFT} {LEFT}{RVS}
{OFF}{LEFT} {LEFT}";
RX 1670 IFLEN(IP$)>254THEN GOT
O 1790
SH 1680 GETPS:IFPS$=""THEN1660
XP 1690 IFASC(PS)=19ORASC(PS)=
147THENGOTO1660
SK 1700 IFPS$=""THENRETURN
PP 1710 IF PS$="{DOWN}" OR PS$="
{UP}" OR PS$="{RIGHT}"
{SPACE}OR PS$="{LEFT}"
{SPACE}THEN 1660
RQ 1720 PRINTPS;"{RVS} {OFF}
{LEFT} {LEFT}";
AA 1730 IFASC(PS)<>20ANDASC(PS
)<>130ANDASC(PS)<>13TH
ENIP$=IP$+PS:GOTO1660
HR 1740 IFASC(PS)=13THENRETURN
XA 1750 IF LEN(IP$)<1 AND (ASC
(PS)=20ORASC(PS)=157)T
HENPRINT"{RIGHT}";:GOT
O1650
BE 1760 IF LEN(IP$)=1 AND (ASC
(PS)=20ORASC(PS)=157)T
HENGOTO1650
QB 1770 IFASC(PS)=20ORASC(PS)=
157THENIP$=LEFT$(IP$,L
EN(IP$)-1):GOTO1660
MH 1780 GOTO1660
JQ 1790 PRINT:PRINT"NO
{SHIFT-SPACE}MORE
{SHIFT-SPACE}THAN
{SHIFT-SPACE}254 CHARA
CTERS":PRINT
XE 1800 GOTO 1650
KD 1810 GETPS:IFPS$=""THEN1810
CG 1820 GOTO 1660
FP 1830 SYS770
DD 1840 REM PRINT QUESTIONS
QQ 1850 X=0:FORI=1TON:IFX<LEN(
Q$(I))THENX=LEN(Q$(I))
AB 1860 NEXTI
SF 1870 IT=X+9:CN=INT(80/IT):Q
C=CN
RJ 1880 N5=14+INT(LEN(RQ$)/80)
+INT(LEN(I$)/80)+2*INT
(N/QC)
FC 1890 NL=8+INT(LEN(RQ$)/80)+
INT(LEN(I$)/80)+2*INT(
N/QC)
FH 1900 PRINT#1:PRINT#1,RQ$:PR
INT#1:T=CN:PRINT#1,I$:
PRINT#1:PRINT#1:FORI=1
TON
KR 1910 PRINT#1,I;". ";Q$(I);S
PC(IT-LEN(Q$(I))-LEN(S
TR$(I))-3);
BA 1920 T=T-1:IFT=<0THENT=CN:P
RINT#1:PRINT#1
XQ 1930 NEXTI:PRINT#1:RETURN
SC 1940 POKE40503,128:POKE4050
4,128:POKE53280,6:POKE
53281,0:POKE646,1
AG 1950 FORI=1TO15:CLOSEI:NEXT
:RETURN
XG 1960 PRINT"{CLR}"TAB(8)
{RVS}{6 SPACES}RIDDLE
{SHIFT-SPACE}MENU
{7 SPACES}{OFF}"
GP 1970 PRINTTAB(8)XS$TAB(32)X
S$
KE 1980 PRINTTAB(8)XS$TAB(10)"
1 = GET{SHIFT-SPACE}FR
OM{SHIFT-SPACE}DISK"TA
B(32)XS$
PC 1990 PRINTTAB(8)XS$TAB(10)"
2 = CREATE
{SHIFT-SPACE}NEW
{SHIFT-SPACE}RIDDLE"TA
B(32)XS$
GA 2000 PRINTTAB(8)XS$TAB(10)"
3 = CORRECT"TAB(32)XS$
FR 2010 PRINTTAB(8)XS$TAB(10)"
4 = SAVE{SHIFT-SPACE}T
O{SHIFT-SPACE}DISK"TAB
(32)XS$
XH 2020 PRINTTAB(8)XS$TAB(10)"
5 = PRINT"TAB(32)XS$
PA 2030 PRINTTAB(8)XS$TAB(10)"
6 = PRINT{SHIFT-SPACE}
ANSWERS"TAB(32)XS$
XF 2040 PRINTTAB(8)XS$TAB(10)"
7 = DISK{SHIFT-SPACE}D
IRECTORY"TAB(32)XS$
DF 2050 PRINTTAB(8)XS$TAB(10)"
8 = CLEAR{SHIFT-SPACE}
MEMORY"TAB(32)XS$
AM 2060 PRINTTAB(8)XS$TAB(10)"
9 = QUIT"TAB(32)XS$
JF 2070 PRINTTAB(8)XS$TAB(32)X
S$
CX 2080 PRINTTAB(8)"{RVS}
{7 SPACES}HIT
{SHIFT-SPACE}CHOICE
{SHIFT-SPACE}
{7 SPACES}{OFF}"
KF 2090 RETURN
DH 2100 ZZ$=""
JQ 2110 GET#5,Z$:IFASC(Z$)<>13
THENZ$=ZZ$+Z$:GOTO211
0
EF 2120 RETURN
PC 2130 IF N5>63 THEN PRINT#1:
PRINT#1:PRINT#1
HM 2140 IF N5>63 THEN N5=N5-63
:RETURN
PG 2150 RETURN
GB 2160 PA$="A":H=5:GOTO70
KJ 2170 C=1

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BH 2180 SS=" ":FORBL=0TO18:SS=SS+" ":NEXT	KF 2360 GET#8,B\$:IFB\$<>" "THEN2360	2250
SS 2190 OPEN8,8,0,"\$"	BK 2370 NEXT:C=C+1	BK 2490 XL=ASC(H\$+CHR\$(0)):XL\$=STR\$(XL+256*ASC(XB\$+CHR\$(0)))
JP 2200 PRINT "{CLR}";	JF 2380 IF C=2 THEN PRINT CHR\$(19)+"{DOWN}";:GOTO2250	SE 2500 POKE214,23:POKE211,10:PRINT CHR\$(145);"{PUR}";XL\$;" BLOCKS FREE ":CLOSE8:XC=1
PH 2210 GET#8,B\$:IFB\$<>CHR\$(34)THEN2210	HG 2390 PRINT "{HOME}{23 DOWN}"CHR\$(158)"{6 SPACES}{RVS}SPACE{OFF} = MORE{SHIFT-SPACE}";	RA 2510 PRINT "{12 SPACES}{RVS}";CHR\$(158);"HIT{SPACE}SPACE BAR";
FM 2220 PRINTSPC(8)"{RVS}";"{GRN}";B\$;	RJ 2400 PRINT "{4 SPACES}{RVS}M{OFF} = MENU";	GK 2520 GETA\$:IFA\$=" "THEN2520
FR 2230 GET#8,B\$:IFB\$<>" "THENPRINTB\$;:GOTO2230	DP 2410 GETJ\$:IFJ\$=" "THEN2410	QK 2530 IFA\$<>" "THEN2520
EJ 2240 PRINT	QA 2420 IFJ\$<>" "ANDJ\$<>"M"THEN2410	SR 2540 PRINTCHR\$(5)+CHR\$(147):GOTO30
SG 2250 FOR E=0 TO 19	CF 2430 PRINT "{HOME}{23 DOWN}{37 SPACES}";	DQ 2550 DATA 128,112,207,250,195
FR 2260 GET#8,B\$:GET#8,H\$,L\$	QD 2440 IFJ\$="M"THENCLOSE8:GOTO30	GS 2560 RESTORE:FORRI=139TO143:READRN:POKERI,RN:NEXT:POKE649,1:XS\$="{RVS}{SPACE}{OFF}"
JH 2270 GET#8,B\$:IFB\$<>" "THEN2490	KB 2450 PRINT "{HOME}"+"{DOWN}";	QR 2570 BS\$="{CLR}{24 DOWN}"
QM 2280 GET#8,B\$:IFB\$<>CHR\$(34)THEN 2280	JM 2460 IF C/2<>INT(C/2)THENFORXL=0TO19:PRINTSS:NEXT:GOTO2480	KQ 2580 BL\$="{40 SPACES}"
AB 2290 IF C/2=INT(C/2) THEN PRINTTAB(19)" ";	GH 2470 FORXL=0TO19:PRINTTAB(19);SS:NEXT	HG 2590 HN\$="{RVS}< TO{SHIFT-SPACE}GO{SHIFT-SPACE}BACK{OFF}{HOME}"
MM 2300 FORXL=1TO16:GET#8,B\$	AC 2480 PRINT "{DOWN}"; SS;SS;"{HOME}";"{DOWN}";:GOTO	MC 2600 RETURN
BM 2310 IFB\$=" " OR B\$=CHR\$(34)THEN B\$=" "		
PP 2320 PRINT "{WHT}"B\$;:NEXT		
XP 2330 GET#8,B\$		
SR 2340 GET#8,B\$:IFB\$=" "THEN2340		
RG 2350 PRINT ",";B\$;" "		

M I L T O N J O H N S O N

If you are a GEOS user, how would you like to replace that program's plain pointer with something more lively? *Magic Mouse* is an animated replacement. It changes the shape of your pointer from an arrow to a mouse whose tail moves back and forth.

Now, instead of using an arrow to make your selections with GEOS applications, you can make a tail-wagging mouse scurry across the screen. Next to the mouse's head in the upper left corner of the sprite, you'll notice a small arrow. This is the pointer's hot spot. Use this area to select menus and icons.

Getting Started

Magic Mouse is written entirely in BASIC. To help prevent typing errors, use *The Automatic Proofreader* to type it in; see "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program.

Note: The listing following this article is for GEOS version 2.0; if you are using GEOS version 1.2, enter line 560 as follows.

560 DATA 141, 49, 227, 169, 1, 141, 50, 227

When you are ready to use *Magic*

MAGIC MOUSE

CHANGE YOUR 64'S
GEOS POINTER TO A
FRIENDLY MOUSE
THAT WAGS ITS TAIL

Mouse for the first time, have a blank disk handy. When you run the program, you will be prompted to insert a blank disk in drive 8. *Magic Mouse* formats the disk and then writes the header/icon block, application file, and GEOS directory entry to the disk using direct access commands. When the program has finished creating the new pointer, you're ready to use it.

Boot GEOS, open your new *Magic Mouse* disk, and click on the mouse icon. The program will load

and put the interrupt request (irq) routine and data in place and then exit back to the deskTop.

Mouse Mechanics

Magic Mouse runs in the background of a GEOS application by wedging into the GEOS irq routine. Every time an irq is executed, *Magic Mouse* adds a number to a counter. After a certain number is reached, the program redraws the mouse's tail in another position, making it appear to move.

If you've ever changed the shape of your pointer with GEOS's preference manager, you know that GEOS will load the new shape data whenever a disk that contains the preference manager is read. *Magic Mouse*, however, overrides this new data. The program resides at the bottom of the hardware stack at \$0100, and the graphics data resides at \$0291.

MAGIC MOUSE

```
BE 1 REM COPYRIGHT 1991 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
AG 100 PRINT "{CLR}INSERT A BL
    ANK DISK IN DRIVE 8"
SR 110 PRINT "{DOWN}{YEL}(WARN
    ING! DISK WILL BE FORMA
    TTED){7}"
FS 120 PRINT:PRINT"PRESS SPACE
    TO BEGIN"
DJ 130 GET AN$:IF AN$<>" " THE
```




PROGRAMS

N 130	DA 320 DATA 193,131,255,193,13	AS 550 DATA 4,150,2,63,0,120,1
BB 140 PRINT:PRINT:PRINT"WORKI	1,255,193,129	69,0
NG";:WOS=""	AP 330 DATA 255,129,128,255,1,	FB 560 DATA 141,246,250,169,1,
CE 150 OPEN 15,8,15,"N0:MAGIC,	128,126,1	141,247,250
91"	RM 340 DATA 128,8,1,128,8,1,12	CH 570 DATA 88,76,44,194,32,18
RF 160 FOR T = 1 TO 177:READ D	8,144	3,193,150
A:D1\$=D1\$+CHR\$(DA):NEXT	QQ 350 DATA 1,255,255,255,131,	XG 580 DATA 2,193,132,51,0,238
:PRINT WOS;	6,0,0	,82,1
MB 170 FOR T = 1 TO 32:READ DA	RK 360 DATA 4,0,4,0,4,77,97,10	RR 590 DATA 160,0,173,82,1,201
:D2\$=D2\$+CHR\$(DA):NEXT:	3	,30,208
PRINT WOS;	MH 370 DATA 105,99,32,77,111,1	DE 600 DATA 4,162,205,160,2,20
CA 180 FOR T = 1 TO 181:READ D	17,115,101	1,42,208
A:D3\$=D3\$+CHR\$(DA):NEXT	GS 380 DATA 32,118,49,46,48,0,	DM 610 DATA 4,162,209,160,2,20
:PRINT WOS;	0,0	1,72,208
CP 190 OPEN 2,8,2,"#":PRINT WO	AB 390 DATA 0,77,105,108,116,1	BJ 620 DATA 4,162,205,160,2,20
S;	11,110,32	1,84,208
BA 200 PRINT#15,"U1 2 0 17 0":	MG 400 DATA 74,111,104,110,115	RE 630 DATA 9,162,201,160,2,16
PRINT#2,D3\$:PRINT#15,"U	,111,110,32	9,0,141
2 2 0 17 0":PRINT WOS;	SC 410 DATA 32,32,32,32,0,0,0,	HC 640 DATA 82,1,192,0,240,21,
MG 210 PRINT#15,"U1 2 0 17 1":	0	134,2
PRINT#2,D1\$:PRINT#15,"U	RF 420 DATA 0,0,0,0,0,0,0,0	SM 650 DATA 132,3,160,0,162,0,
2 2 0 17 1":PRINT WOS;	KE 430 DATA 0,0,0,0,0,0,0,0	177,2
PS 220 PRINT#15,"U1 2 0 18 1":	FP 440 DATA 0,0,0,0,0,0,0,0	GB 660 DATA 157,245,132,232,23
PRINT#2,D2\$:PRINT#15,"U	BM 450 DATA 0,0,0,0,0,0,0,0	2,232,200,192
2 2 0 18 1":PRINT WOS;	RM 460 DATA 0,0,0,0,0,0,0,0	GF 670 DATA 4,208,243,108,157,
DQ 230 PRINT#15,"B-A 0 17 00"	SD 470 DATA 65,110,105,109,97,	132,0,192
QB 240 PRINT#15,"B-A 0 17 01"	116,101,100	HJ 680 DATA 0,0,128,0,0,0,0,0
BP 250 CLOSE2:CLOSE15	PD 480 DATA 32,80,111,105,110,	EB 690 DATA 0,24,0,0,60,0,0,12
SF 260 PRINT:PRINT:PRINT"DONE!	116,101,114	6
"	HB 490 DATA 0,0,255,131,17,0,7	AM 700 DATA 0,0,60,0,0,126,0,0
MJ 270 DATA 0,255,3,21,191,255	7,97	XJ 710 DATA 255,0,1,255,128,3,
,255,255	HD 500 DATA 103,105,99,32,77,1	255,192
FK 280 DATA 128,0,1,128,0,1,12	11,117,115	HE 720 DATA 3,255,192,3,255,19
8,24	ER 510 DATA 101,160,160,160,16	2,3,255
BF 290 DATA 1,128,60,1,128,126	0,160,17,1	DF 730 DATA 192,1,255,128,0,25
,1,128	DQ 520 DATA 0,6,91,3,3,10,48,1	5,0,0
SH 300 DATA 60,1,128,126,1,128	SC 530 DATA 0,0,255,32,183,193	BS 740 DATA 126,0,8,8,144,96,8
,255,1	,33,4	,8
PG 310 DATA 129,255,129,131,25	GR 540 DATA 0,1,83,0,32,183,19	DJ 750 DATA 8,8,16,16,9,6
5,193,131,255	3,116	

B R A D B I S H O P

This program is a combination of several disk utility routines which allows easy tracing of files and editing of disk sectors on both single- and double-sided Commodore disks. *T/E 80* is for the 128 in 80-column mode with a single 1571 disk drive designated as device 8.

The program consists of a disk sector editor, file tracer, block allocation map display, sequential file lister, routines for freeing and allocating sectors in the disk BAM, and a disk directory listing routine.

Typing It In

T/E 80 is written entirely in BASIC but includes machine language subroutines. To avoid typing errors, use *The Automatic Proofreader* to enter the program; see "Typing Aids" elsewhere in this section. When you have finished typing, be sure to save a copy of the program to disk before you try to run it.

T/E 80

THIS UTILITY
COMBINES A DISK
SECTOR EDITOR, FILE
TRACER, SEQUENTIAL
LISTER, AND MORE
FOR THE 128 IN 80-
COLUMN MODE

How to Use the Program

After you load and run *T/E 80*, there will be a short pause for setup before the main menu screen appears. From

the menu select any of the following routines by pressing the key that is highlighted in red.

Editor Press E to enter the editor routine. You will be prompted for the track and sector to load. Enter the desired numbers in decimal. The program will load and display the data contents of the entered sector, and the editor menu will appear. Use the cursor keys to move through the displayed data. From the editor menu several choices are available.

N N loads and displays the contents of the next linked sector in the file, shown after *link* at the bottom of the screen display. If there is no link, an error message will be displayed, and you'll be returned to the main menu.

J J loads and displays the sector defined by the value under the editor cursor (track) and the value to the



PROGRAMS

right of the cursor (sector). This is useful for jumping to the first sector of a file from a directory sector.

L L clears the editor menu screen and prompts for a track and sector to load. The program then loads and displays the entered sector data and redisplay the editor menu.

Shift + and Shift - These key combinations load and display the sector one track above or below the currently displayed sector. For example, from track 4, sector 15, **SHIFT +** will load and display track 5, sector 15; **SHIFT -** will go to track 3, sector 15.

+ and - These load and display one sector above or below the sector currently displayed. For example, from track 4, sector 15, press **+** to move to track 4, sector 16; press **-** to move to track 4, sector 14.

S S stores the currently displayed sector data to a memory buffer.

P P pulls the data stored in the memory buffer and displays it on the screen. The data will not be written to disk until **W** is selected.

C C allows you to change the value of the data byte under the editor cursor. You will be prompted to enter the desired data value. Values should be in decimal form. The new value will not be written to disk until **W** is selected.

T T allows you to enter text in the sector data display, starting at the location of the editor cursor. The Return key must be pressed when text entry is complete. The new data will not be written to disk until **W** is selected.

W W writes the currently displayed data to disk at the current track and sector, indicated at the bottom left of the screen display. **W** must be selected before any changes made to displayed data will be saved to disk.

Z Z fills the current data display with zero bytes. You will then be asked whether to write the zero data to disk. **Y** will write the zeros; **N** will not.

Q Q exits the editor and returns you to the main menu.

BAM Map Press **B** from the main menu to select the BAM display routine. You will be prompted to insert the disk whose BAM you want displayed and then press Return. The program will then read and display the disk BAM for both single- and double-sided disks. Press the Return key for the main menu.

Tracer Press **T** from the main menu to access the tracer routine. You will be prompted to enter the name of the file to be traced, after which the program traces the entered file through the disk. When the trace is complete, a listing will be displayed on the screen in linked order of all sectors occupied by the file. The load address for program files and the directory sector containing the selected filename will also be displayed.

If the sector listing is longer than can be displayed on one screen, you will be prompted to press the Return key to continue the listing. When the screen listing is complete, you will be asked whether you want a hardcopy printout of the sector listing.

Sequential File Lister Press **S** from the main menu to select the sequential file lister routine. You will be prompted to enter the name of the file to list. The program will then list the file to the screen. Press the No Scroll key during the listing to pause. When the listing is complete, press Return to go back to the main menu.

Allocate Sector Press **A** from the main menu to enter the sector allocation routine. You will be prompted to enter the track and sector numbers of the sector you wish to allocate, at which time the program will allocate the sector in the disk BAM. You will then be asked whether you want to continue. Press **Y** to return to the allocate prompt; **N** returns you to the main menu.

Free Sector Press **F** from the main menu for the sector free routine. This routine works in the same manner as the sector allocate routine, freeing sectors in the BAM instead of allocating them.

Directory Press **D** from the main menu to display the directory of the disk currently in the drive. Press **No**

Scroll to pause the listing if necessary. When the listing is complete, you will be prompted to press the Return key to go back to the main menu.

Quit Press **Q** from the main menu to clear the screen and exit the program.

T/E 80

```

BE 1 REM COPYRIGHT 1991 - COMP
    UTE PUBLICATIONS INTL LTD
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PK 10 IFPEEK(215)<>128THENPRIN
    T"{CLR}{3 DOWN}SWITCH MO
    NITOR TO 80 COLUMNS-PRES
    S A KEY":GETKEY$:GRAPHI
    C5
GJ 20 PRINT"{CLR}{3 DOWN}
    {5 RIGHT}SETTING UP T/E
    {SPACE}80 . . ."
JB 30 FAST:COLOR6,1:DCLOSE:GOS
    UB2720
DS 40 PRINT"{CLR}{BLU}"SPC(27)
    "{A}CCCCCCCCCCCCCCCCCCCC
    CCCCCC{S}"
SC 50 PRINTSPC(27)"B{A}CCCCCCC
    CCCCCCCCCCCCCCCCCC{S}B"
PD 60 PRINTSPC(27)"BB
    {9 SPACES}{6}T/E 80
    {9 SPACES}{BLU}BB"
XJ 70 PRINTSPC(27)"BB {22 U} B
    B"
KJ 80 PRINTSPC(27)"BB
    {7 SPACES}{6}MAIN
    {2 SPACES}MENU{7 SPACES}
    {BLU}BB"
MP 90 PRINTSPC(27)"B{Z}CCCCCCC
    CCCCCCCCCCCCCCCCCC{X}B"
HC 100 PRINTSPC(21)"{A}CCCCC
    {E}CCCCCCCC{10 SPACES}C
    CCCCCC{E}CCCCC{S}"
CJ 110 PRINTSPC(21)"B{A}CCCCC
    CCCCCCCCCCCCCCCCCC{S}B"
KF 120 FORN=1TO7:PRINTSPC(21)"
    BB"SPC(36)"BB":NEXT
KG 130 PRINTSPC(21)"B{Z}CCCCC
    CCCCCCCCCCCCCCCCCC{X}B"
GA 140 PRINTSPC(21)"{Z}CCCCCCC
    CCCCCCCCCCCCCCCCCC{X}B"
DX 150 PRINTGB$ET$G2$M2$G3$M3$
    G4$M4$G5$M5$CHR$(27)"L"
SD 160 GETKEY$:GOSUB1060
SH 170 IFA$="D"THENGOSUB2350:G
    OTO40
PR 180 IFA$="A"THENA$=AL$:B$=S
    A$:C$=AG$:D$="B-A":GOTO
    2260
HX 190 IFA$="F"THENA$=SF$:B$=F
    R$:C$=FG$:D$="B-F":GOTO
    2260
FD 200 IFA$="T"THEN1300
QE 210 IFA$="E"THEN280
HG 220 IFA$="S"THEN2130
PQ 230 IFA$="B"THEN2430
GJ 240 IFA$="Q"THENPRINT"{CLR}
    {CYN}":END
RD 250 GOTO150
KB 260 :
  
```




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```

BR 270 REM EDITOR
RJ 280 PRINTGASIES:SYS49176,0,
0,0
SM 290 SYS49176,0,16,8:PRINT"
{BLU}{A}CCCCCCCCCCCC{E}
CCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCC{E}CCCC
CCCCCCC{S}"
PK 300 FORN=17TO20:SYS49176,0,
N,8:PRINT"B"SPC(64)"B":
NEXT
EA 310 SYS49176,0,21,8:PRINT"
{Q}CCCCCCCCCCCC{R}CCCCC
CCCC{R}CCCCCCCCCCCCCCCC
CC{R}CCCCCCCCCCCC{R}CCCC
CCCCC{W}"
QC 320 SYS49176,0,22,8:PRINT"B
{2 SPACES}{6}TRK:{BLU}
{5 SPACES}B {6}SCT:
{BLU}{5 SPACES}B {6}LIN
K: T{4 SPACES}S{BLU}
{5 SPACES}B {6}POS:
{BLU}{6 SPACES}B {6}VAL
:{BLU}{5 SPACES}B"
JA 330 SYS49176,0,23,8:PRINT"
{Z}CCCCCCCCCCCC{E}CCCCC
CCCC{E}CCCCCCCCCCCCCCCC
CC{E}CCCCCCCCCCCC{E}CCCC
CCCCC{X}"
SE 340 GOSUB1060:PRINTGB$SET$G4
$EES
AE 350 WINDOW33,11,38,12:INPUT
T:WINDOW48,11,53,12:INP
UTS
HH 360 WINDOW0,0,79,24:IFT=0TH
ENGOSUB1060:PRINTG4$ZRS
:SLEEP2:GOTO40
EB 370 GOSUB1160:SYS49176,0,22,
17:PRINT"{2 SPACES}":S
YS49176,0,22,27:PRINT"
{3 SPACES}"
AX 380 SYS49176,0,22,41:PRINT"
{3 SPACES}":SYS49176,0,
22,46:PRINT"{3 SPACES}"
HB 390 SYS49176,0,22,58:PRINT"
{3 SPACES}":SYS49176,0,
22,69:PRINT"{4 SPACES}"
AA 400 GOSUB2660:SYS49176,0,22,
16:PRINT"{WHT}"T:SYS49
176,0,22,27:PRINTS
BH 410 PRINT#15,"U1";5;0;T;S:P
RINTCHRS(14)CHRS(27)"M"
MF 420 WINDOW9,17,72,20,1:SYS6
710:TN=PEEK(6144):SN=PE
EK(6145)
GB 430 PRINTCHRS(142);:WINDOW0
,0,79,24:PRINTCHRS(27)"
L";
EQ 440 GOSUB2670:GOSUB1120
FG 450 PRINTGB$SET$G2$Q2$G3$Q3$
G4$Q4$G5$Q5$G6$Q6$G7$Q7
$:IFPTHENP=0:GOTO470
AP 460 I=0:K=17:J=9:M=6144
AJ 470 SYS49176,0,0,0:GOSUB930
XX 480 GETKEYAS
XP 490 IFA$="C"THEN840
HF 500 IFA$="T"THEN880
XD 510 SYS49176,0,K,J:SYS49155
,PEEK(M+I),143
EQ 520 IFA$="{UP}"THEN690
MM 530 IFA$="{DOWN}"THEN720
KG 540 IFA$="{LEFT}"THEN750
PM 550 IFA$="{RIGHT}"THEN780
PC 560 IFA$="Z"THEN970
RM 570 IFA$="Q"THEN40
AR 580 IFA$="L"THEN340
RS 590 IFA$="J"THENT=PEEK(M+I)
:S=PEEK(M+I+1):GOTO370
HJ 600 IFA$="W"THEN1010
BQ 610 IFA$="N"THENT=TN:S=SN:G
OTO360
EQ 620 IFA$="+"THENT=T+1:GOTO3
70
CJ 630 IFA$="-"THENT=T-1:GOTO3
70
XK 640 IFA$="--"THENS=S-1:GOTO3
70
RM 650 IFA$="+"THENS=S+1:GOTO3
70
JJ 660 IFA$="P"THENPRINTGB$
{RED}PULLING-{6}":FORN=
6144TO6399:POKEN,PEEK(N
+256):NEXT:GOSUB1070:GO
TO450
HJ 670 IFA$="S"THENPRINTGB$
{RED}STORING-{6}":FORN=
6144TO6399:POKEN+256,PE
EK(N):NEXT:GOTO450
SA 680 GOTO480
XC 690 I=I-64:K=K-1
HS 700 IFK=16THENK=20
HB 710 GOTO800
GA 720 I=I+64:K=K+1
GQ 730 IFK=21THENK=17
PD 740 GOTO800
DX 750 I=I-1:J=J-1
DP 760 IFJ=8THENJ=72:K=K-1:IFK
=16THENK=20
XF 770 GOTO800
XX 780 I=I+1:J=J+1
AM 790 IFJ=73THENJ=9:K=K+1:IFK
=21THENK=17
GC 800 IFI<0THENI=I+256
MR 810 IFI>255THENI=I-256
JG 820 SYS49176,0,22,58:PRINT"
{3 SPACES}":SYS49176,0,
22,69:PRINT"{4 SPACES}"
DP 830 GOTO470
DD 840 GOSUB1060:PRINTG4$NV$
CH 850 WINDOW67,22,72,22:INPUT
X:PRINT"HOME";:WINDO
W0,0,79,24
HD 860 POKE(M+I),X:GOSUB930
SR 870 GOTO920
FP 880 GOSUB1060:PRINTG4$TX$:D
O:GETKEYAS:IFA$=CHRS(13
)THENEXIT
CJ 890 POKE(M+I),ASC(A$):SYS49
176,0,K,J:SYS49155,PEEK
(M+I),143
JE 900 I=I+1:J=J+1:IFJ=73THENJ
=9:K=K+1:IFK=21THENK=17
DG 910 GOSUB930:LOOP
FB 920 GOSUB1120:P=-1:GOTO450
DA 930 IF(PEEK(M+I))+128>255TH
ENSYS49176,0,K,J:SYS491
55,(PEEK(M+I))-128,143:
GOTO950
KA 940 SYS49176,0,K,J:SYS49155
,(PEEK(M+I))+128,143
HP 950 SYS49176,0,22,57:PRINT"
{WHT}"I:SYS49176,0,22,6
8:PRINT"{4 SPACES}
{4 LEFT}"PEEK(M+I)
SD 960 RETURN
CE 970 PRINTGB$ {RED}ZEROING-
{6}":FORN=6144TO6399:PO
KEN,0:NEXT
AF 980 WINDOW9,17,72,20,1:PRIN
T"{WHT}"CHRS(14)CHRS(27
)"M";:SYS6690
BQ 990 WINDOW0,0,79,24:PRINTCH
RS(142)CHRS(27)"L";
MP 1000 PRINTGB$ {RED} WRITE?
{SPACE}{6}":GETKEYAS:I
FA$<"Y"THEN450
EG 1010 GOSUB1060:PRINTG4$00$G
BSCSS:GETKEYAS:IFA$<>C
HRS(13)THEN1010
FR 1020 PRINTGB$ {6}WRITING:"G
4SCMSG3$MT$
XJ 1030 PRINTG5$ {6 SPACES}"T"
{12 SPACES}"S:GOSUB266
0
RG 1040 SYS6673:PRINT#5,CHRS(P
EEK(6144));:PRINT#15,"
U2";5;0;T;S
BJ 1050 GOSUB2670:GOSUB1060:GO
TO450
MR 1060 PRINTG1$CM$G2$CM$G3$CM
$G4$CM$G5$CM$G6$CM$G7$
CM$GB$SCSS:RETURN
SF 1070 SYS49176,0,22,16:PRINT
"{WHT}"T
ED 1080 SYS49176,0,22,27:PRINT
S
BR 1090 WINDOW9,17,72,20,1:PRI
NTCHRS(14)CHRS(27)"M";
RB 1100 SYS6690
HS 1110 WINDOW0,0,79,24:PRINTC
HRS(142)CHRS(27)"L";
QB 1120 SYS49176,0,0,0:PRINT"
{WHT}"
CR 1130 SYS49176,0,22,40:PRINT
TN
FG 1140 SYS49176,0,22,45:PRINT
SN
SK 1150 RETURN
GQ 1160 IFT<1THENT=1:RETURN
QS 1170 IFT>70THENT=70:RETURN
CR 1180 IFS<0THENS=0:RETURN
GS 1190 IFT<18ANDS>20THENS=20:
RETURN
MH 1200 IFT>17ANDT<25ANDS>18TH
ENS=18:RETURN
GX 1210 IFT>24ANDT<31ANDS>17TH
ENS=17:RETURN
BS 1220 IFT>30ANDT<36ANDS>16TH
ENS=16:RETURN
QK 1230 IFT>35ANDT<53ANDS>20TH
ENS=20:RETURN
PG 1240 IFT>52ANDT<60ANDS>18TH
ENS=18:RETURN
RS 1250 IFT>59ANDT<66ANDS>17TH
ENS=17:RETURN
RH 1260 IFT>65ANDT<71ANDS>16TH
ENS=16:RETURN
XB 1270 RETURN
HB 1280 :
SM 1290 REM TRACER
FH 1300 PRINTG4$TLGB$SET$G2$SCM
$G4$CM$G6$CM$G3$FES
PM 1310 WINDOW35,12,54,12,1:IN
PUTF$:IFF$=""THENWINDO
W0,0,79,24:GOTO40
QF 1320 DOUNTILLEN(F$)=16:F$=F
$+CHRS(160):LOOP:WINDO
W0,0,79,24
JF 1330 PRINTGB$SCSSG3$CM$G5$CM
$G4$00$:GETKEYAS:IFA$<
>CHRS(13)THEN1330
XA 1340 PRINTG4$TJ$

```




PROGRAMS

KX 1350	X=6767:SD=1:GOSUB2660	B{6}SECTOR:{BLU}BB{6}B	0,60,22,1:WINDOW0,0,79
SR 1360	PRINT#15,"U1";5;0;18;S	LK:{BLU}B{6}SECTOR:	24
	D:GOSUB2680:SYS6656	{BLU}BB{6}BLK:{BLU}B	HB 1900 MN=MN+1:RETURN
HQ 1370	G\$=F\$:FORN=0TO15:A\$=LE	{6}SECTOR:{BLU}B	EF 1910 SYS49176,0,24,19:PRINT
	FT\$(G\$,1):POKEX+N,ASC(	PRINTAT\$"B{6}CCCC{BLU}	"LISTING COMPLETE - PR
	A\$):G\$=RIGHT\$(G\$,15-N)	B{6}CCCCCCC{BLU}BB{6}C	ESS RETURN TO CONTINUE
	:NEXTN	CCC{BLU}B{6}CCCCCCC	"
JP 1380	SYS6738:A=PEEK(254):IF	{BLU}BB{6}CCCC{BLU}B	KE 1920 GETKEYA\$:IFA\$<>CHR\$(13
	ATHEN1400	{6}CCCCCCC{BLU}B	)THEN1920
PE 1390	SD=PEEK(6145):GOTO1360	FORN=1TO13:PRINTAT\$"B	BA 1930 SYS49176,0,24,19:PRINT
MC 1400	LT(0)=PEEK(6127+A):LS(	{4 SPACES}B	"{8 SPACES}PRINT SECTO
	0)=PEEK(6128+A):FT=PEE	{3 SHIFT-SPACE}	R LISTING? (Y/N)
	K(6126+A)	{3 SHIFT-SPACE}BB	{9 SPACES}"
FK 1410	PRINT#15,"U1";5;0;LT(0	{SHIFT-SPACE}	MJ 1940 GETKEYA\$:IFA\$="N"THEN4
	);LS(0)	{2 SHIFT-SPACE}B	0
CR 1420	GET#5,A\$:GET#5,B\$:LS(1	{4 SPACES}	ME 1950 IFA\$<>"Y"THEN1940
	)=ASC(B\$):LT(1)=ASC(A\$	{3 SHIFT-SPACE}BB	EE 1960 SYS49176,0,24,19:PRINT
	):AD=0	{3 SHIFT-SPACE}B	"{13 SPACES}PRINTING S
BX 1430	IFFT=129THENAD\$="SEQ":	{2 SHIFT-SPACE}	ECTORS..{6 SPACES}"
	GOTO1470	{2 SPACES}	CK 1970 OPEN4,4,4:PRINT#4,CHR\$(
SD 1440	IFFT=133THENAD\$="REL":	{3 SHIFT-SPACE}B":NEXT	(27)CHR\$(14)"
	GOTO1470	PRINTAT\$"{Z}CCCC{E}CCC	{5 SPACES}"F\$
KE 1450	IFFT=132THENAD\$="USER"	CCCCX}{Z}CCCC{E}CCCC	BR 1980 PRINT#4,"{10 SPACES}DI
	:GOTO1470	CC{X}{Z}CCCC{E}CCCCC	RECTORY: 18 -"SD
DD 1460	GET#5,A\$:GET#5,B\$:A=AS	{X}"	FB 1990 PRINT#4,"{10 SPACES}TO
	C(A\$):B=ASC(B\$):AD=B*2	EQ 1700 PRINT"{GRN}":SYS49176,	TAL BLOCKS:"YE
	56+A:AD\$=HEX\$(AD)	0,0,0:SYS49176,0,1,27:	JC 2000 PRINT#4,"{10 SPACES}LD
XJ 1470	TN=LT(1):SN=LS(1)	PRINTF\$:SYS49176,0,5,3	ADR: HEX - "AD\$
RK 1480	PRINT#15,"U1";5;0;TN;S	9:PRINTSD	BA 2010 PRINT#4,"{18 SPACES}DE
	N	BF 1710 SYS49176,0,1,57:PRINTY	C -"AD
KX 1490	PRINTG4STR\$:Y=2	E:SYS49176,0,3,35:PRIN	QD 2020 PRINT#4,"{10 SPACES}BL
XX 1500	DO	TLT(0)	OCK{8 SPACES}SECTOR"
PE 1510	GET#5,A\$:GET#5,B\$:LS(Y	MS 1720 SYS49176,0,3,39:PRINTL	QG 2030 PRINT#4,"{10 SPACES}--
	)=ASC(B\$):LT(Y)=ASC(A\$	S(0):SYS49176,0,4,54:P	---{8 SPACES}-----"
	)	RINTAD\$:SYS49176,0,5,5	DF 2040 FORN=1TOYE
MK 1520	IFLT(Y)=0THENEXIT	3:PRINTAD	AP 2050 IFN<10THENPRINT#4," "
EF 1530	PRINT#15,"U1";5;0;LT(Y	DH 1730 MN=0:FORN=1TOYE	MR 2060 PRINT#4,"{11 SPACES}"N
	);LS(Y)	BG 1740 M=MN*39:IFN<14+MTHENK=	"{7 SPACES}"LT(N-1)="-
BJ 1540	Y=Y+1:IFY=255THENEXIT	9+N-M:A=N1:B=N2:C=N3:G	LS(N-1)
HB 1550	LOOP	OTO1780	MJ 2070 NEXTN:PRINT#4,CHR\$(27)
XA 1560	YE=Y:GOSUB2670	RK 1750 IFN<27+MTHENK=N-4-M:A=	"e":CLOSE4
RH 1570	PRINTCHR\$(27)"M";	N4:B=N5:C=N6:GOTO1780	DR 2080 SYS49176,0,24,19:PRINT
KP 1580	PRINT"{CLR}"AT\$"{BLU}	CF 1760 IFN<40+MTHENK=N-17-M:A=	" PRINT COMPLETE - PRE
	{A}CCCCCCCCCCCCCCCCCCC	=N7:B=N8:C=N9:GOTO1780	SS RETURN TO CONTINUE"
	CCC{R}CCCCCCCCCCCCCCCC	RA 1770 IFN=40+MTHENGOSUB1870:	RX 2090 GETKEYA\$:IFA\$<>CHR\$(13
	C{S}"	GOTO1740	)THEN2090
MA 1590	PRINTAT\$"B{6}FILE:	FA 1780 SYS49176,0,0,0:PRINT:S	JR 2100 GOTO40
	{17 SPACES}{BLU}B{6}TO	YS49176,0,K,A:PRINTN	QE 2110 :
	TAL BLOCKS:{4 SPACES}	EK 1790 SYS49176,0,K,B:PRINTLT	SG 2120 REM SEQ LISTER
	{BLU}B"	(N-1)	BP 2130 PRINTGA\$TS\$G4\$CM\$G3\$TF
RA 1600	PRINTAT\$"{Q}CCCCCCCCC	CJ 1800 SYS49176,0,K,C:PRINTLS	\$
	CCCCCCCCCCCC+CCCCCCCC	(N-1)	CK 2140 WINDOW25,12,55,12:INPU
	CCCCCCCC{W}"	JG 1810 IFN=254THENBEGIN	T"{4 SPACES}? END
KD 1610	PRINTAT\$"B{6}FIRST SEC	SM 1820 :SYS49176,0,24,15:PRIN	{5 LEFT}";F\$
	TOR:{9 SPACES}{BLU}B	T"MAXIMUM ENTRIES REAC	HA 2150 WINDOW0,0,79,24:IFF\$="
	{6}LOAD ADDRESS:	HED - PRESS RETURN TO	END"THEN40
	{4 SPACES}{BLU}B"	{SPACE}CONTINUE"	XR 2160 PRINTG3\$CM\$G5\$CM\$G4\$00
HB 1620	PRINTAT\$"{Q}CCCCCCCCC	HJ 1830 :GETKEYA\$:IFA\$<>CHR\$(1	\$:GETKEYA\$:IFA\$<>CHR\$(
	CCCCCCCCCCCC{W}	3)THEN1830	13)THEN2160
	{3 SPACES}{6}HEX -	KP 1840 :SYS49176,0,24,15:PRIN	FP 2170 PRINTG4\$CM\$G\$F\$M=67
	{9 SPACES}{BLU}B"	TSPC(59)	67:X=0:FORN=1TOLEN(G\$)
KX 1630	PRINTAT\$"B{6}DIRECTO	EH 1850 BEND	:POKEX+X,ASC(LEFT\$(G\$,
	:{5 SPACES}{GRN}18	SS 1860 NEXTN:GOTO1910	1))
	{5 SPACES}{BLU}B	CP 1870 SYS49176,0,24,25:PRINT	G\$=RIGHT\$(G\$,LEN(G\$)-1
	{3 SPACES}{6}DEC -	"MORE - PRESS RETURN T	):X=X+1:NEXTN:PRINT"
	{9 SPACES}{BLU}B"	O CONTINUE":GETKEYA\$	{CLR}{DOWN}"SPC(40-LEN
RJ 1640	PRINTAT\$"{Z}CCCCCCCCC	DB 1880 SYS49176,0,24,25:PRINT	(F\$)/2)"{RVS}{GRN}"F\$"
	CCCCCCCCCCCC{E}CCCCC	CHR\$(27)"Q":IFA\$<>CHR\$(	{OFF}"
	CCCCCCCC{X}"	(13)THEN1870	CH 2190 PRINT{HOME}{RVS}{RED}
XH 1650	PRINTAT\$"{A}CCCC{R}CCC	DX 1890 WINDOW21,10,24,22,1:WI	"NO SCROLL" TO PAUSE L
	CCCC{S}{A}CCCC{R}CCCC	NDOW26,10,32,22,1:WIND	ISTING{OFF}{CYN}"CHR\$(
	CC{S}{A}CCCC{R}CCCCC	OW35,10,38,22,1:WINDOW	14)
	{S}"	40,10,46,22,1:WINDOW49	AE 2200 WINDOW0,3,79,24:SYS678
KJ 1660	PRINTAT\$"B{6}BLK:{BLU}	,10,52,22,1:WINDOW54,1	3,LEN(F\$)

PROGRAMS

XE 2210	GOSUB2680:WINDOW0,0,79,24	HE 2530	1920{6}"	SE 2840	Q7\$="{6} (Z)-ZERO SECT
DE 2220	PRINT "{HOME}"CHR\$(27)"	HE 2530	WINDOW0,0,79,24:C=5:FO	OR{2 SPACES}/	
	Q"SPC(60)CHR\$(142)"		RX=5T0141STEP4:IFX>71T	{2 SPACES}(Q) - QUIT "	
	{RVS}{RED}RETURN TO CO	JS 2540	IFX>99THENPOKE6957,0	ZR\$="{RED}{5 SPACES}TR	
QE 2230	NTINUE{OFF}":GETKEYAS	BP 2550	IFX>123THENPOKE6956,0	ACK CANNOT BE ZERO	
XR 2240	GOTO40	BD 2560	SYS49176,0,0,0:SYS4917	{6 SPACES}"	
GF 2250	REM ALLOCATE / FREE		6,0,3,C:POKE250,X:SYS6	SC 2860	EE\$="{6}{3 SPACES}TRAC
SQ 2260	PRINTGAS\$GB\$SET\$G2\$B\$G		833:C=C+1:NEXTX:IFSSTH	K{9 SPACES}SECTOR	
	4\$EE\$		EN2620	{9 SPACES}"	
MP 2270	WINDOW33,11,38,12:INPU	PG 2570	GOSUB2660:PRINT#15,"U1	AF 2870	TF\$="{6}{3 SPACES}FILE
	TT:WINDOW48,11,53,12:I		";5;0;53;0:SYS6656:GOS	NAME TO LIST (OR END)	
EG 2280	WINDOW0,0,79,24:IFT=0T		UB2670:FORX=0T0102STEP	{3 SPACES}"	
	HENPRINTG4\$ZR\$:SLEEP2:	ER 2580	3	BH 2880	TR\$="{6} -- LOADING LI
	GOTO40	DQ 2590	IFX>50THENPOKE6958,0	NK INFORMATION -- "	
SE 2290	PRINTGB\$CS\$G2\$CS\$G4\$EE\$	RK 2600	IFX>70THENPOKE6957,0	SX 2890	TJ\$="{6} ----- SEARCHI
	G4\$"{9 RIGHT}"T"	EA 2610	IFX>89THENPOKE6956,0	NG FOR FILE ----- "	
	{12 RIGHT}"S		SYS49176,0,0,0:SYS4917	CC 2900	SA\$="{6}{7 SPACES}SECT
EF 2300	GOSUB2660:PRINT#15,D\$;	JC 2620	6,0,3,C:POKE250,X:SYS6	OR TO ALLOCATE	
	0;T;S:PRINT#15,"U1";5;		833:C=C+1:NEXTX	{7 SPACES}"	
	0;18;0:GOSUB2670	JJ 2630	WINDOW0,0,79,24:SYS491	KC 2910	FR\$="{6}{9 SPACES}SECT
AH 2310	PRINTG2SCM\$G4\$CA\$:GETK		76,0,0,0	OR TO FREE{9 SPACES}"	
	EYAS:IFA\$="Y"THEN2260		SYS49176,0,24,65:PRINT	PS 2920	AG\$="{6}{11 SPACES}ALL
FM 2320	GOTO40		"{RED}{RVS}RETURN TO E	OCATING:{10 SPACES}"	
BC 2330	:		XIT{OFF}":GETKEYAS:IFA	CC 2930	FG\$="{6}{12 SPACES}FRE
SG 2340	REM DIRECTORY	JS 2640	\$<>CHR\$(13)THEN2630	EING:{12 SPACES}"	
GG 2350	PRINT "{CLR}{CYN}":WIND	EH 2650	GOTO40	HD 2940	FE\$="{6}{12 SPACES}FIL
	OW29,0,79,24:SLOW	DR 2660		ENAME:{11 SPACES}"	
CX 2360	DIRECTORY:FAST		OPEN15,8,15:OPEN5,8,5,	MS 2950	IE\$="{6} EDITOR - TRAC
DJ 2370	PRINT "{2 DOWN}		"#:GOSUB2680:RETURN	KS 1-70 "	
	{2 SPACES}PRESS ANY KE	SQ 2670	DCLOSE:GOSUB2680:RETUR	PH 2960	TL\$="{6}{5 SPACES}FILE
	Y FOR MENU"		N	{2 SPACES}TRACER	
CA 2380	WINDOW0,0,79,24	RA 2680	IFDS>1THENGOSUB1060:PR	{5 SPACES}"	
RH 2390	GETKEYAS		INTG4\$FUS\$G6\$D\$:DCLOSE	MG 2970	TS\$="{6}SEQUENTIAL FIL
RH 2400	RETURN		:SLEEP3:GOTO40	E LISTER"	
FH 2410	:	XP 2690	RETURN	PR 2980	AL\$="{6}{3 SPACES}SECT
MA 2420	REM BAM	DK 2700	:	OR{2 SPACES}ALLOCATE	
BQ 2430	PRINTGAS\$BA\$G4\$00\$	BP 2710	REM SETUP	{3 SPACES}"	
PA 2440	GETKEYAS:IFA\$<>CHR\$(13	FQ 2720	N1=21:N2=26:N3=29:N4=3	EB 2990	SF\$="{6}{5 SPACES}SECT
	)THEN2440		5:N5=40:N6=43:N7=49:N8	OR{2 SPACES}FREE	
MG 2450	PRINTG4\$CM\$GB\$"{6}LOAD		=54:N9=57	{5 SPACES}"	
	ING:"M=6144:GOSUB2660	DX 2730	MT\$="{6}{6 SPACES}TRAC	MF 3000	BA\$="{6}{3 SPACES}DISK
	:PRINT#15,"U1";5;0;18;		K{10 SPACES}SECTOR	BAM DISPLAY{3 SPACES}	
	0:SYS6656:GOSUB2670:A\$		{5 SPACES}"	"	
	=CHR\$(PEEK(M+3)):IFA\$<	EG 2740	CA\$="{6}{8 SPACES}CONT	CC 3010	ET\$="{6} ENTER : "
	>CHR\$(128)THENS=-1:EL		INUE?{2 SPACES}(Y/N)	MX 3020	M2\$="{2 SPACES}{RED}E
GS 2460	SESS=0		{8 SPACES}"	{6}DITOR{11 SPACES}	
	N\$="":N=144:DOUNTILAS=	HQ 2750	FUS\$="{6}{5 SPACES}DISK	{RED}B{6}AM MAP{BLU}	
	CHR\$(160):A\$=CHR\$(PEEK		ERROR - TRY AGAIN	{6 SPACES}"	
	(M+N)):N\$=N\$+A\$:N=N+1:	PQ 2760	{5 SPACES}"	RK 3030	M3\$="{2 SPACES}{RED}T
	LOOP		00\$="{6}{3 SPACES}INSE	{6}RACER{11 SPACES}	
AS 2470	A\$=CHR\$(PEEK(M+162)):B		RT DISK - PRESS RETURN	{RED}S{6}EQ LISTER	
	\$=CHR\$(PEEK(M+163)):I\$	CP 2770	{3 SPACES}"	{BLU}{3 SPACES}"	
	=A\$+B\$		NVS\$="{6}{9 SPACES}ENTE	RS 3040	M4\$="{2 SPACES}{RED}A
QJ 2480	PRINT "{CLR}{GRN}"SPC(3		R NEW VALUE{8 SPACES}"	{6}LLOCATE SECTOR	
	5)"{RVS}"N\$"{2 SPACES}	CD 2780	TX\$="{6}{3 SPACES}ENTE	{2 SPACES}{RED}F{6}REE	
	"IS"{OFF}"		R TEXT-RETURN WHEN DON	SECTOR{BLU}{2 SPACES}	
JK 2490	PRINTCHR\$(27)"M"SPC(14		E{3 SPACES}"	"	
	)"{YEL}111111111122222	DK 2790	Q2\$="{6} (N)-NEXT / (J	FD 3050	M5\$="{2 SPACES}{RED}D
	22222333333";		)-JUMP / (L)-LOAD "	{6}IRECTORY{8 SPACES}	
BS 2500	IFSS=0THENPRINT"333344	RC 2800	Q3\$="{6}SHIFT (+) OR (	{RED}Q{6}UIT	
	44444444555555556666		-){2 SPACES}-	{10 SPACES}"	
	66666667":ELSEPRINT		{2 SPACES}CHANGE TRACK	EK 3060	CM\$="{33 SPACES}"
KE 2510	PRINTSPC(5)"1234567890	AB 2810	Q4\$="{6}{2 SPACES}(+)	XE 3070	AT\$="{20 SPACES}"
	1234567890123456789012		{SPACE}OR (-)	PB 3080	CS\$="{8 SPACES}"
	345";:IFSS=0THENPRINT"		{2 SPACES}-{2 SPACES}C	KR 3090	GA\$="{HOME}{4 DOWN}
	6789012345678901234567		HANGE SECTOR{2 SPACES}		{30 RIGHT}"
	8901234567890":ELSEPRI		"	BP 3100	GB\$="{HOME}{6 DOWN}
	NT				{37 RIGHT}"
KH 2520	WINDOW2,3,3,24:PRINT"	EB 2820	Q5\$="{6}{3 SPACES}(S)-	JP 3110	GL\$="{HOME}{8 DOWN}
	{SPACE}0 1 2 3 4 5 6 7		STORE / (P)-PULL DATA		{25 RIGHT}"
	8 9101112131415161718		{4 SPACES}"	AH 3120	G2\$="{HOME}{9 DOWN}
		CE 2830	Q6\$="{6}(C)-CHANGE / (		{25 RIGHT}"
			T)-TEXT / (W)-WRITE"	SS 3130	G3\$="{HOME}{10 DOWN}
					{25 RIGHT}"



PROGRAMS

PF 3140 G4\$="{HOME}{11 DOWN}
{25 RIGHT}"

AR 3150 G5\$="{HOME}{12 DOWN}
{25 RIGHT}"

RH 3160 G6\$="{HOME}{13 DOWN}
{25 RIGHT}"

MB 3170 G7\$="{HOME}{14 DOWN}
{25 RIGHT}"

AC 3180 DIMLT (255), LS (255)

HS 3190 FORX=0TO304:READC:POKE
6656+X,C:NEXT:RETURN

HA 3200 DATA162,5,32,198,255,1
60,0,32,207,255,153,0,
24,200,208,247,96,162,
5,32

BJ 3210 DATA201,255,160,1,185,
0,24,32,210,255,200,20
8,247,96,169,0,133,250
,164

CK 3220 DATA250,185,0,24,32,47
,204,32,237,203,230,25
0,208,241,96,169,0,133
,250

MS 3230 DATA162,5,32,198,255,1
64,250,32,207,255,153,
0,24,32,47,204,32,237,
203

AM 3240 DATA230,250,208,238,96
,160,0,162,0,185,0,24,
221,111,26,240,8,162,0
,200

HE 3250 DATA208,243,134,254,96
,200,232,224,15,208,23
4,132,254,96,0,0,0,0,0
,0

GS 3260 DATA0,0,0,0,0,0,0,0,0,
0,162,111,160,26,32,18
9,255,169,5,162,8,160,
5,32

BR 3270 DATA186,255,169,0,162,
0,32,104,255,32,192,25
5,162,5,32,198,255,32,
207

AX 3280 DATA255,32,210,255,165
,144,240,246,169,5,32,
195,255,32,204,255,96,
164

QQ 3290 DATA250,185,0,24,160,8
,24,10,144,3,32,18,27,
136,208,246,230,250,16
4,250

SP 3300 DATA185,0,24,160,16,24
,10,144,3,32,18,27,136
,192,8,208,244,230,250
,164

KF 3310 DATA250,185,0,24,10,10
,10,160,21,24,10,144,3
,32,18,27,136,192,16,2
08

HR 3320 DATA244,169,1,133,250,
164,250,185,26,27,240,
11,32,47,204,32,90,200
,230

FB 3330 DATA250,76,243,26,160,
1,169,81,153,26,27,200
,192,22,208,248,96,170
,169

AD 3340 DATA45,153,26,27,138,9
6,0,81,81,81,81,81,81,
81,81,81,81,81,81,81,8
1,81

KH 3350 DATA81,81,81,81,81,81,
0

RC 3360 :

ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, we offer additional features and programs every month on *Gazette Disk*. Disks may be purchased for \$9.95 plus \$2.00 shipping and handling. The address is Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Here's a description of this month's bonus.

Mega-Adventure

David M. Williams
Charlestown, NSW, Australia

In this text-based adventure game, you control a teenaged hacker in his quest to add zeros to the pitiful sum in his bank account. Discover what part his archaeologist parents play in this story. Is it true that his foul-tempered grandmother almost became dictator of Cuba before she gave up Marxism and relinquished power to Castro? And how about that policeman who always winks at him at Woolworth's? Can he be trusted?

The game opens in your bedroom. It's a relatively small room, containing more electrical equipment than a NASA tracking station. A stereo on a table next to your unmade bed plays music by Jean-Michel Jarre. Your bookshelf contains exciting titles such as *The Fractal Geometry of Nature*, *68000 Programmers Reference Manual*, and *The Stainless Steel Rat's Revenge*.

On a pizza-stained table rests your Amiga A9000 computer system. A modem connects it to a telephone. Things that may interest you are a leather jacket and a disk with *HackTerm V3.2* on the label. The rest is up to you.

Typing Aids

Attention, New Subscribers!

MLX, our machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. These labor-saving utilities are on each *Gazette Disk* and printed in issues of Gazette through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free copies of both these handy utilities. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

PROGRAMMERS

Gazette is looking for utilities, games, applications, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it on disk to

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324 W. Wendover Ave.
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Please enclose an SASE if you wish to have the materials returned.